



**LEC-2010 Series
Atom N270 (1.6Ghz) CPU onboard
Fanless Embedded System**

User's Manual



LEC-2010 Series User's Manual Version 1.1

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Safety Guidelines

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit.
- LITHIUM BATTERY CAUTION:
Risk of Explosion if Battery is replaced by an incorrect type.
Dispose of used batteries according to the instructions.

Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.

- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

EMC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Class A Notice for FCC

Modifying the equipment without the authorization of Lanner Electronics, Inc. may result in the equipment no longer complying with FCC requirements for Class A digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

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Document History

Date	Revision	Comment
2009/10/5	V1.1	Modify USBG1 Pin assignment (Pin 5) Adding MIC IN/LINE OUT pin assignment

1. Product Overview

1.1 Product Introduction



Figure 1 – LEC-2010 Outlook

The Lanner LUGE LEC-2010 is a fanless embedded system designed for intelligent industrial and commercial applications. It features extensive I/O interfaces, PCI or PCI Express expansion slot, and an onboard Intel® Atom™ embedded processor for exceptional performance with very low heat generation and minimal cooling requirements, resulting in improved stability and longevity, and providing a higher return on investment.

1.2 Features and Benefits

- Fanless embedded system
- Intel Atom 1.6GHz onboard CPU
- VGA, DVI-D video out
- 6 COM ports, 7 USB port
- Supports up to 2GB DDR2 memory
- Dual GbE LAN
- PCI or PCI-E expansion slot
- CompactFlash Type I/II and SATA HDD support

1.3 Specifications

Feature	Description	
Form Factor	Fanless Embedded System	
	Processor	Onboard Intel® Atom™ 1.6 GHz
Platform	Chipset	Intel 945GSE+ICH7M
	BIOS	AMIBIOS with 8Mbit BIOS Flash
System Memory	Technology	533 MHz DDR2 SDRAM
	Socket	200P SODIMM x1
	Onboard Memory	1GB DDR2 onboard
	Maximum Capacity	2GB (1GB DDR2 onboard + 1GB DDR2 module)
Storage Interface	CompactFlash I/II	1
	SATA Port	2
Display		VGA D-Sub 15-pin connector
	Interface	DVI-D
Audio	Codec	ALC888 HD Codec
Networking	Lan Ports	2
	Speed	10/100/1000 Mbps
Front I/O	Digital I/O	DB9 Female 4 in 4 Out
	USB 2.0	6 (Total: 7; External x 6 , Internal x 1)
	LAN	2 x RJ45 GbE
	Mic In / Line Out	1/1
Rear I/O	COM	RS-232 x 4; RS-232/422/485 selectable x 2 ports(COM2& 3)
	DVI	1
	VGA	1
Internal I/O	USB 2.0	1 (Pin header)
Expansion	Lan Ports	PCI x 1 (LEC-2010P)
	Lan Ports	PCIe x 1 (LEC-2010E)
	Speed	Mini-PCIe x 1
Hardware Monitoring	Controller	Winbond W83627UHG integrated hardware monitor
	Watchdog timer	Reset supported, 1~255 level
OS Supported		Linux kernel 2.4.16 or above, XPE/Win
		XP-32 bit, Win CE 6.0
Environmental Parameters	Temperature, ambient operating	-5~45°C (with 2.5" commercial HDD)
		-10°~55°C (with industrial components - CF card, HDD, Memory, adapter)
		Extended Operating Temperature: -20°C: 24 hours bootable; 70° C: 72 hours full-loading operating
	Humidity (RH), ambient operating	10~95% relative humidity, non-condensing
	Storage Temperature	-20°~80°C
Mounting		Wall mounting kit
Physical Dimensions	Dimensions	268(W) x 65(H) x 190(D)
	Net Weight	2.6Kg
Power	Input	DC +9V~36V (ATX Mode)
	Adapter	75W (+19V)

Note: All specifications and images are subject to change without notice.

1.4 Block Diagram

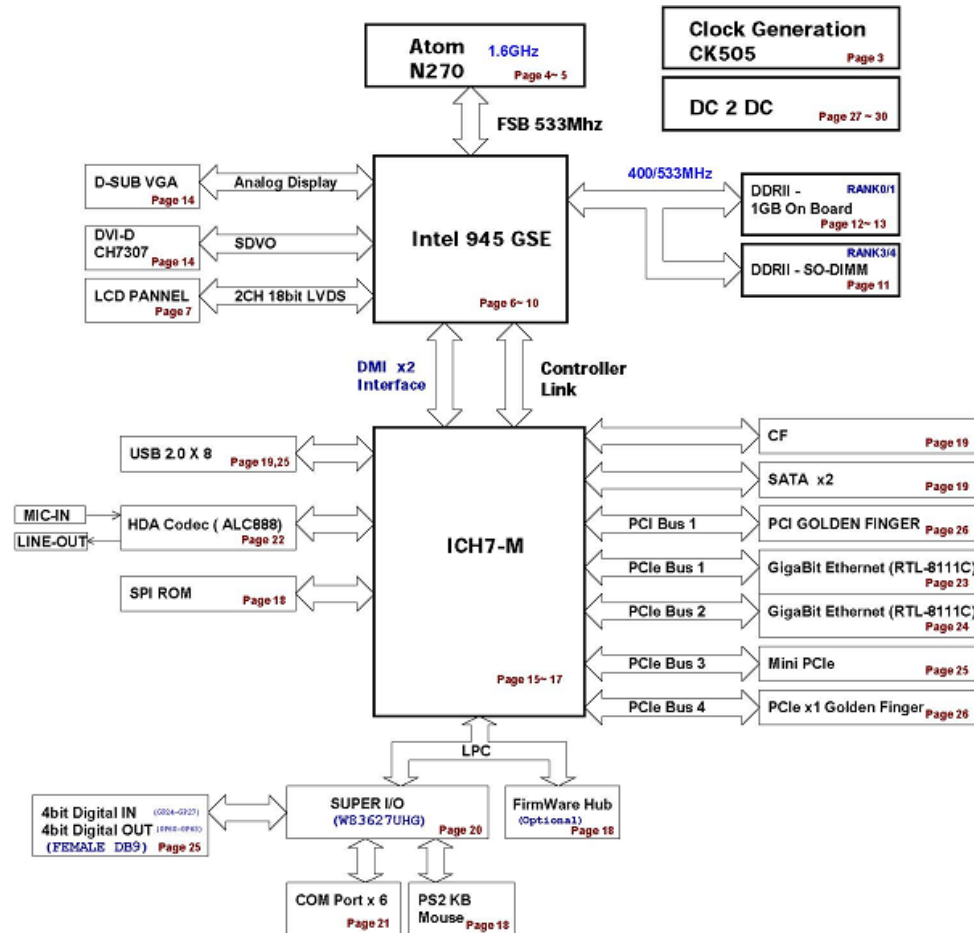


Figure 2 – Block Diagram

1.5 Package Contents

Carefully unpack your package and make sure that you have the following items:

Item	Package Contents	Q'ty	Photo	Ordering Information
1	LEC-2010 Embedded System	1		* LEC-2010P (for PCI Riser card) * LEC-2010E (for PCIe Riser card)
2	DC+19V 75W Power Adapter	1		* P/N: OP0W075190001
3	Serial ATA/Power Cable	1		* P/N: 080W1N2201001
4	HDD Screw (M3x8)	4		* P/N: 070W102400801
5	Wall Mount Screw (M3x6 Ni)	4		* P/N: 070W103000601
6	Wall Mount Kits (Please check chapter 3.2.1)	1		* P/N: SE9ESA829R110
7	Terminal Block (10 pin)	2		* P/N: 04AW201010101
8	Terminal Block (2 pin)	1		* P/N: 04AW20024E101
9	Drivers and User's Manual CD	1		* LEC-2010 CD
10	Carton(Inside) (Dimension: 359x333x164mm)	1	 	* P/N: 085W002204107
11	Carton(Outside) (Dimension: 370x351x191mm)	1	 	* P/N: 085W002104239
*Total Weight of packing: NW: 2.62kgs ; GW: 4kgs				

Note: If you should find any components missing or damaged, please contact your dealer immediately for assistance.

1.6 Technical Assistance

Should you have any questions or problems with your product, please contact the Lanner sales team.

Phone: 886-2-8692-6060
Fax: 886-2-8692-6101
E-mail: support@lannerinc.com

Prior to contacting us, we ask that you first check the electronic product documentation for assistance. Should you still have questions, we recommend you have the following information on hand in order to expedite the process:

1. LEC-2010 model name
2. Serial number
3. Local network configuration details
4. Abnormal behavior and/or error messages reported by your network system
5. Your questions, or a description of the problem you are experiencing

2. System Components

2.1 LEC-2010 Embedded System Mechanisms

This section of the manual describes the mechanical and device nomenclature of the LEC-2010.

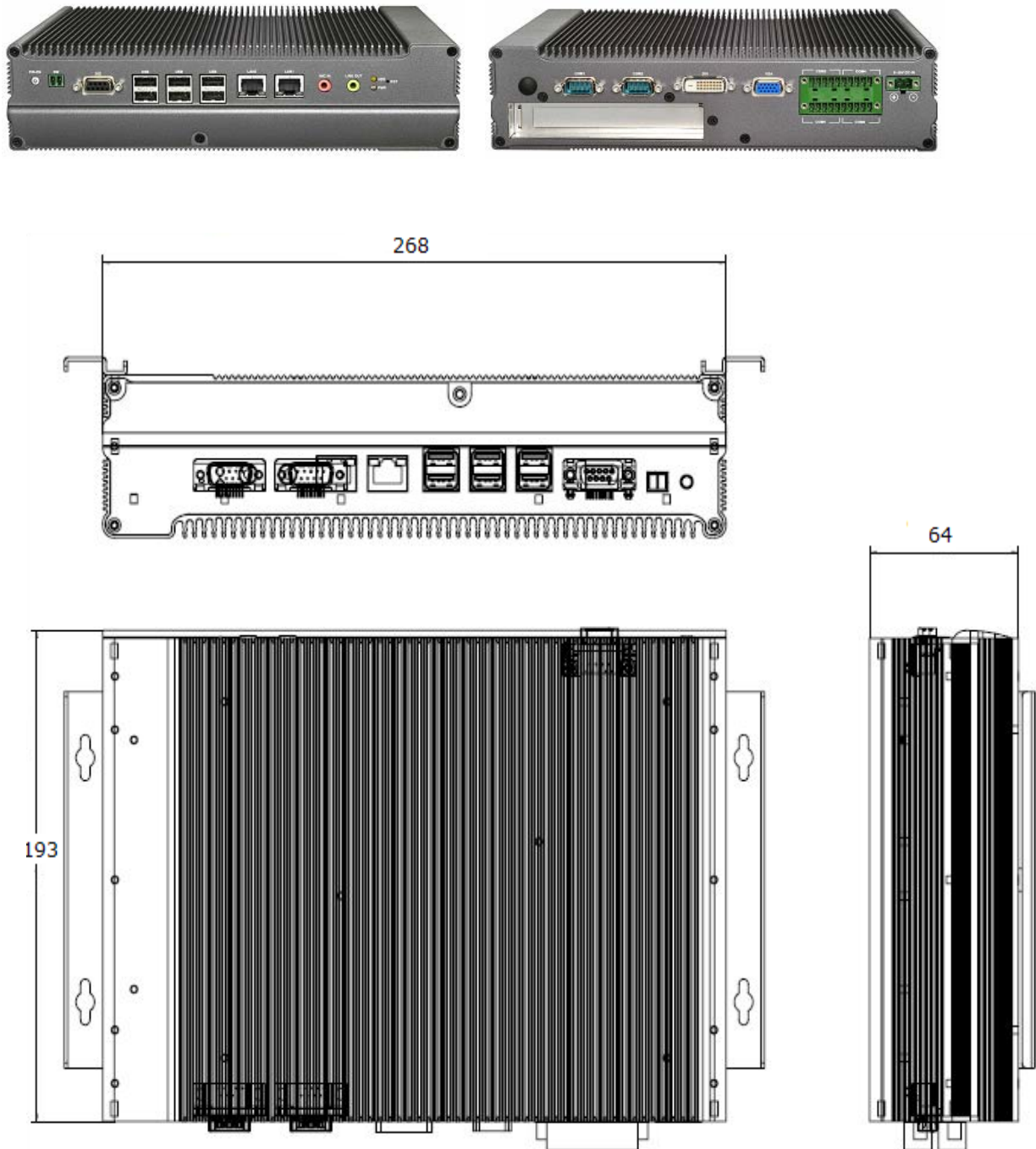


Figure 3 – LEC-2010 System

2.1.1 Front View



Figure4 – LEC-2010 Front View

2.1.2 Rear View

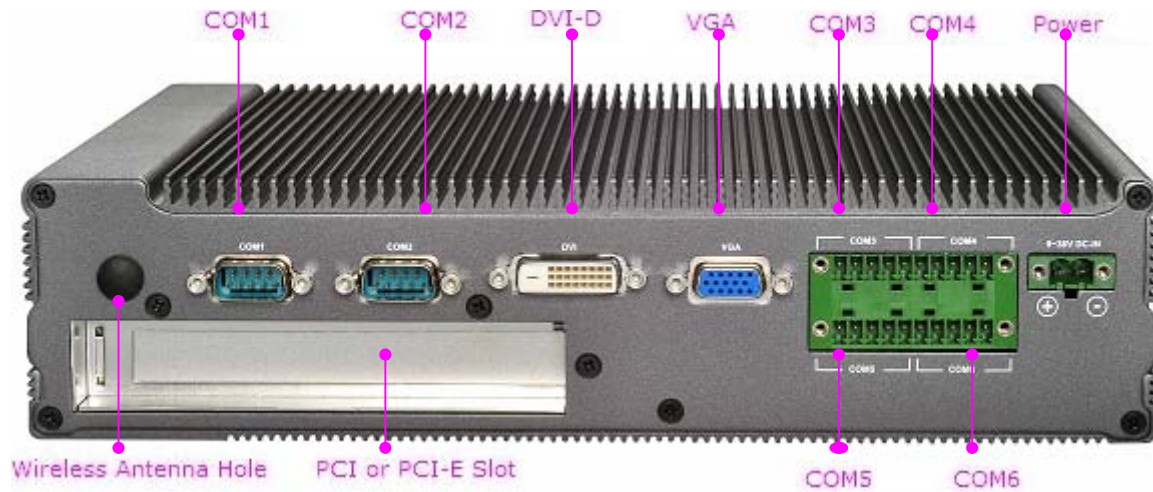


Figure 5– LEC-2010 Rear View

2.2 LEB-2010 System Board

LEB-2010 is the system board bundled with the LEC-2010 Fanless Embedded System platform. The succeeding sections list LEB-2010 related jumper settings and connector pin assignments.

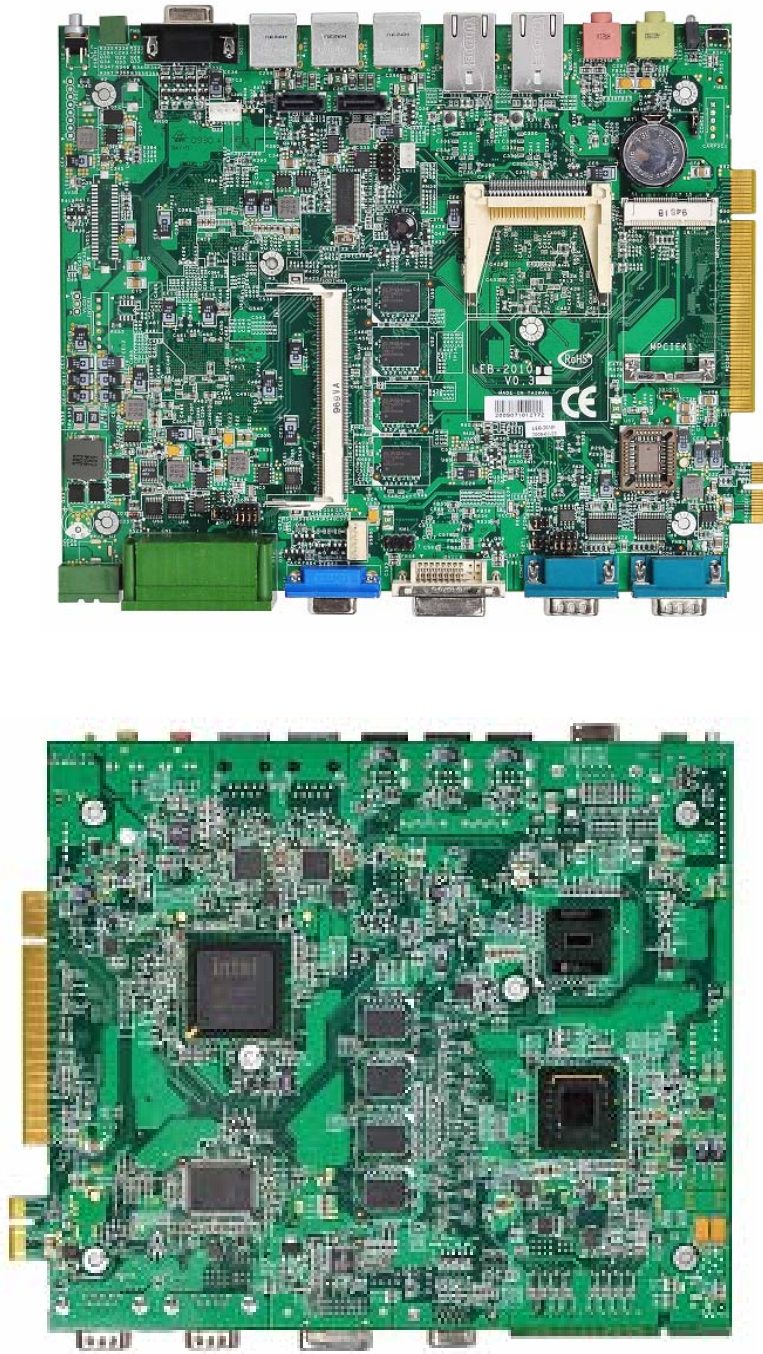
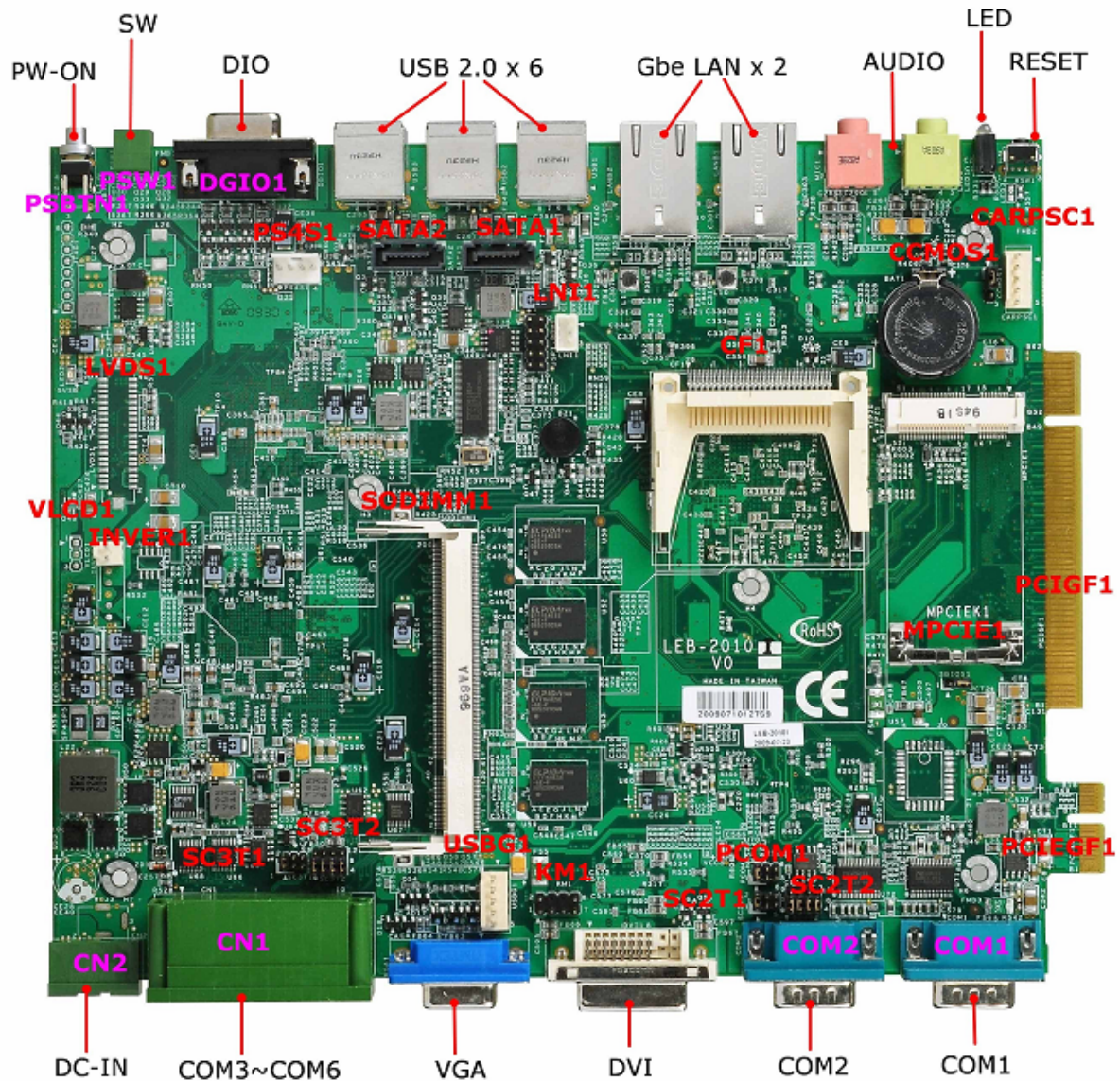


Figure 6 – LEB-2010 System Board

2.2.1 Board View



SC2T2	Select COM2 Type Jumper	CF1	Compact Flash Connector
SC2T1	Select COM2 Type Jumper	CCMOS1	Clear CMOS Data Jumper
PCOM1	Select COM1 Pin9 Signal Jumper	CANPSC1	Car Application 5-Pin Power Connector
KM1	Keyboard/Mouse Connector Header	MPCIE1	Mini PCI Express 1X Connector
USBG1	USB Port#7 5-Pin Power Connector	PCIGF1	120 Pin PCI Golden Finger
SODIMM1	200 PIN DDR2 SODIMM Socket	PCIEGF1	PCI Express 1x Golden Finger
SC3T2	Select COM3 Type Jumper	COM1/2	Serial Port COM1/2 Connector
SC3T1	Select COM3 Type Jumper	CN1	COM3 ~ 6 Connector
VLCD1	Select Panel Voltage Header	CN2	DC-IN Connector
INVER1	7 Pin LCD INVETER Connector	DGIO1	DIO Connector
LVDS1	LVDS Connector	PSW1	SW Connector
PS4S1	4-Pin Power Connector	PSBTN1	PW-ON Button
SATA2	Serial ATA-SATA Socket	MIC1	MIC IN Connector
SATA1	Serial ATA-SATA Socket	LNO1	LINE OUT Connector

Figure 6 – LEB-2010 Board View

2.2.2 Jumper Settings and I/O Connectors

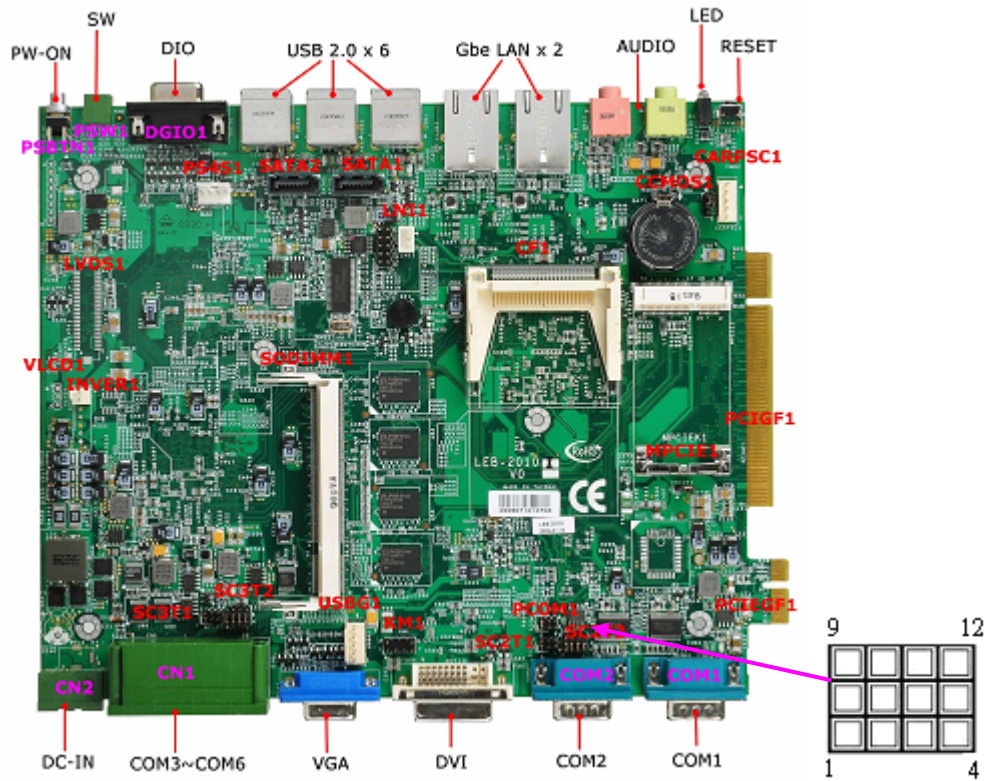
The jumper settings and I/O connectors of the LEC-2010 have been arranged at the factory. Any changes to the schematic or design of these connectors may cause damage to your unit.

Jumper Settings and I/O Connector Summary for LEC-2010 is as below:

CHAPTER	JUMPER	FUNCTION
2.2.3.1	SC2T2	Select COM2 Type Jumper
2.2.3.2	SC2T1	Select COM2 Type Jumper
2.2.3.3	PCOM1	Select COM1 Pin9 Signal Jumper
2.2.3.4	KM1	Keyboard/Mouse Connector Header
2.2.3.5	USBG1	USB Port#7 5-Pin Power Connector (5P Male)
2.2.3.6	SODIMM1	200 PIN DDR2 SODIMM Socket
2.2.3.7	SC3T2	Select COM3 Type Jumper
2.2.3.8	SC3T1	Select COM3 Type Jumper
2.2.3.9	VLCD1	Select Panel Voltage Header (Reserved)
2.2.3.10	INVER1	7 Pin LCD INVETER Connector (Optional)
2.2.3.11	LVDS1	LVDS Connector (Optional)
2.2.3.12	PS4S1	4-Pin Power Connector (4P Male)
2.2.3.13	SATA2	Serial ATA-SATA Socket (Port 2)
2.2.3.13	SATA1	Serial ATA-SATA Socket (Port 1)
2.2.3.14	LNI 1	Line In 3Pin Connector
2.2.3.15	CF1	Compact Flash Connector
2.2.3.16	CCMOS1	Clear CMOS Data Jumper
2.2.3.17	CARPSC1	Car Application 5-Pin Power Connector (5P Male)
2.2.3.18	MPCIE1	Mini PCI Express 1X Connector
2.2.3.19	PCIGF1	120 Pin PCI Golden Finger
2.2.3.20	PCIEGF1	PCI Express 1x Golden Finger
2.2.3.21	COM1/2	Serial Port COM1/2 Connector (D-SUB9 Male)
2.2.3.22	CN1	COM3 – 6 Connector
2.2.3.23	CN2	DC-IN Connector (9 ~ 36V)
2.2.3.24	DGIO1	DIO Connector (D-SUB9 Female)
2.2.3.25	PSW1	SW Connector (ATX Power Switch Connector)
2.2.3.26	PSBTN1	PW-ON Button
2.2.3.27	MIC1	MIC IN Connector
2.2.3.28	LNO1	LINE OUT Connector

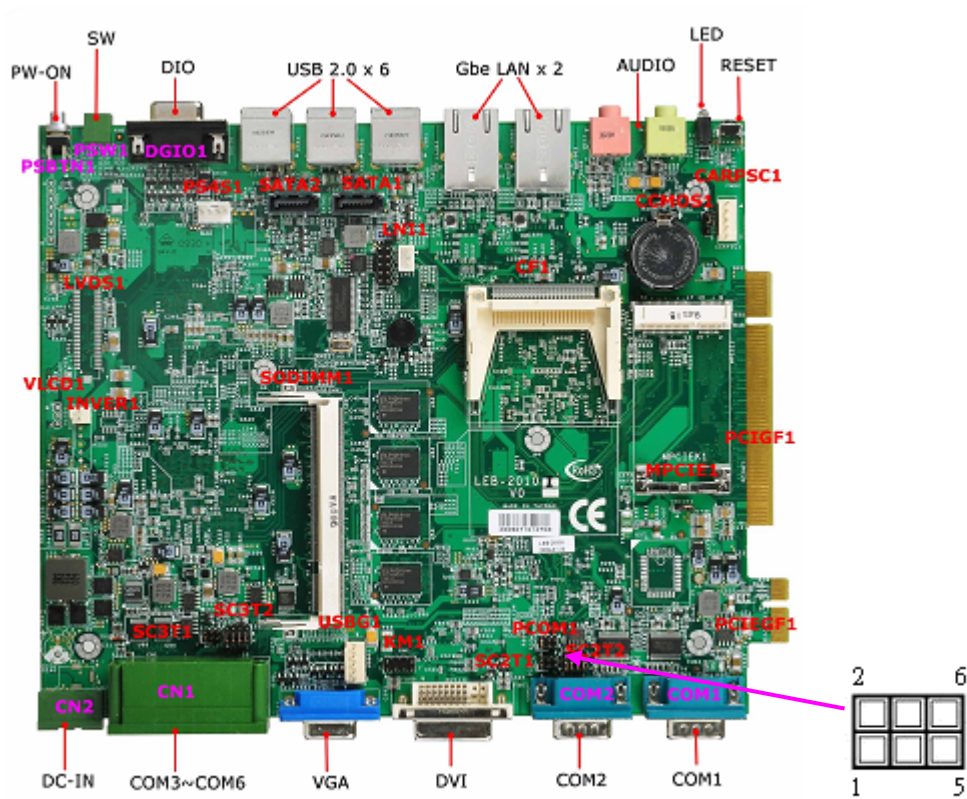
2.2.3 Connector Pin Assignments

2.2.3.1 SC2T2: Select COM2 Type Jumper



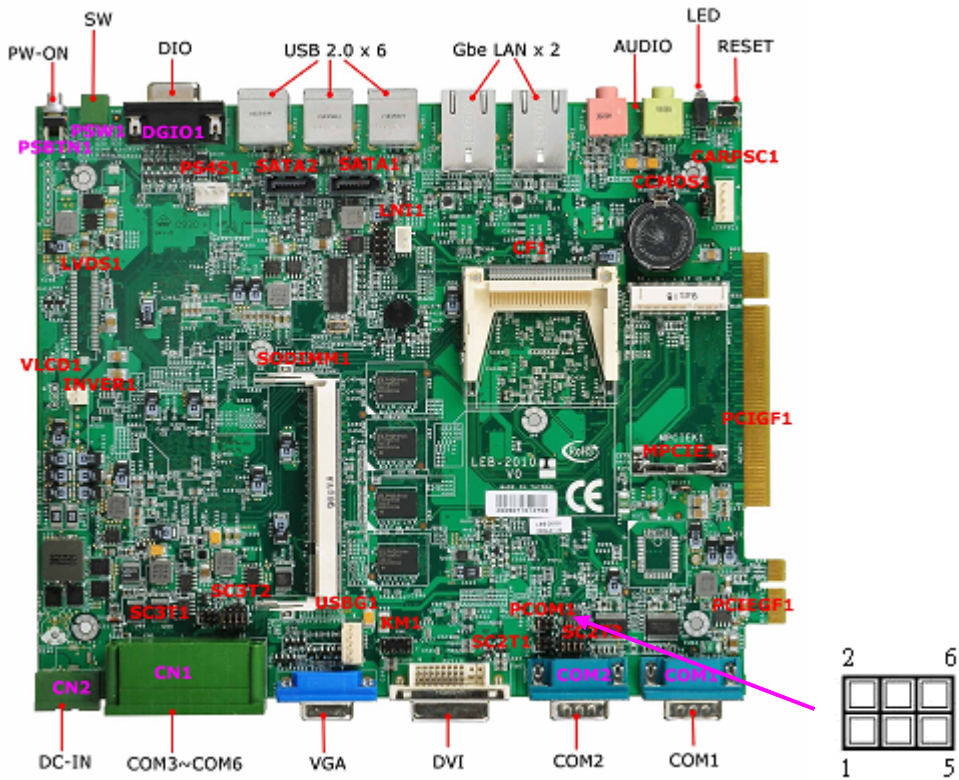
COM2 TYPE	SC2T2
RS-232 (Default)	1-5,2-6,3-7,4-8
RS-422	5-9,6-10,7-11,8-12
RS-485	5-9,6-10,7-11,8-12

2.2.3.2 SC2T1: Select COM2 Type Jumper



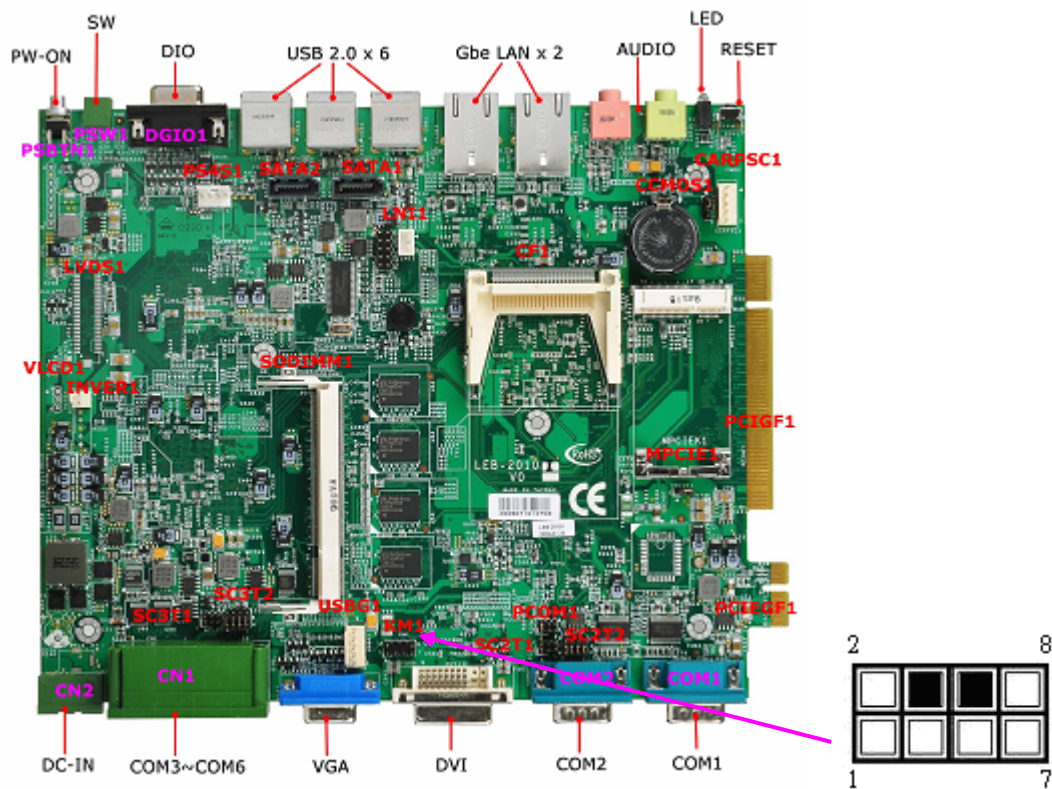
COM2 TYPE	SC2T1
RS-232 (Default)	1-2
RS-422	3-4
RS-485	5-6

2.2.3.3 PCOM1 : Select COM1 Pin9 Signal Jumper



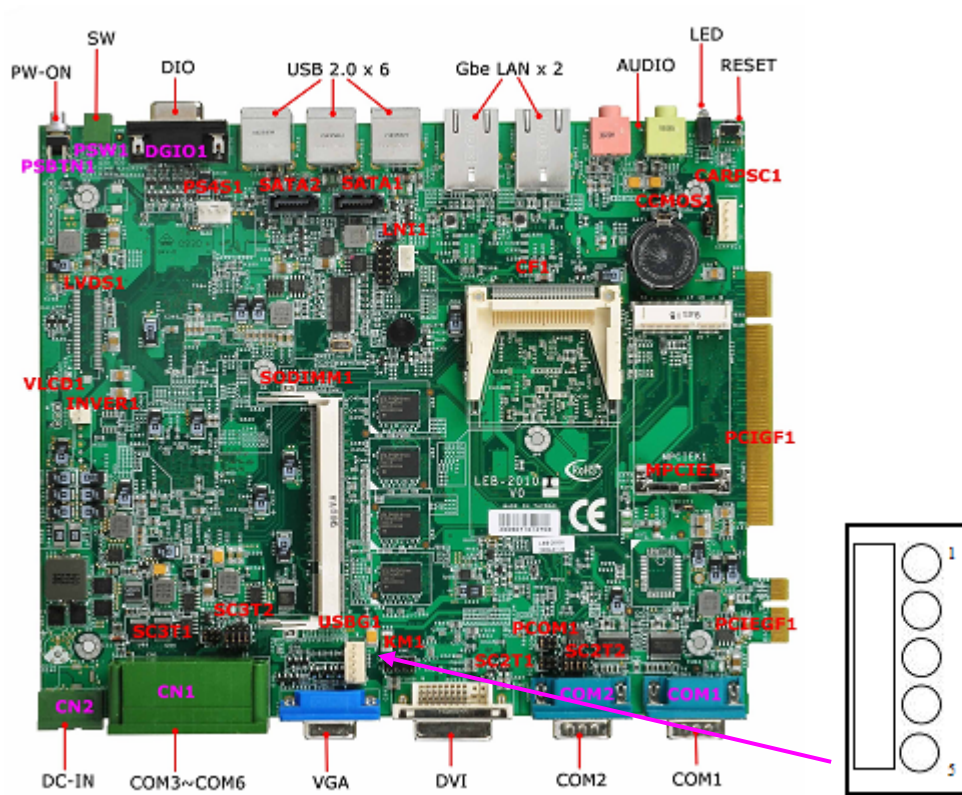
Description	PCOM1
Ring In	1-2 (Default)
+5V	3-4
+12V	5-6

2.2.3.4 KM1 : Keyboard/Mouse Connector Header (for Factory test only)



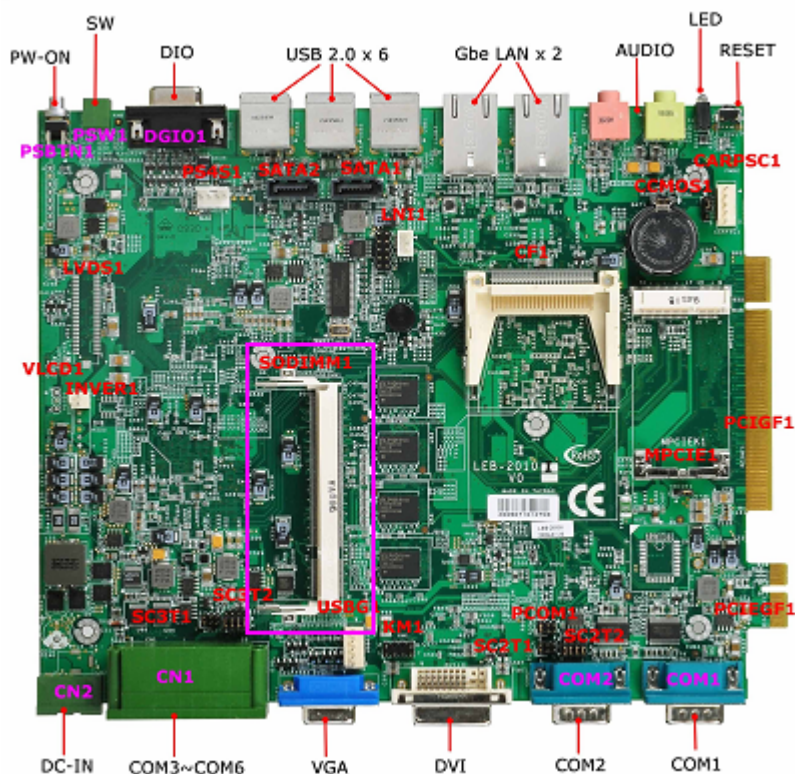
Pin No.	Description	Pin No.	Description
1	+5V	2	MSCLK
3	MSDATA	4	KEY
5	KBDAT	6	KEY
7	GND	8	KBCLK

2.2.3.5 USBG1: USB Port#7 5-Pin Power Connector (5P Male)



Pin No.	Description
1	USB_VCC
2	USBD0-
3	USBD0+
4	Ground
5	NG

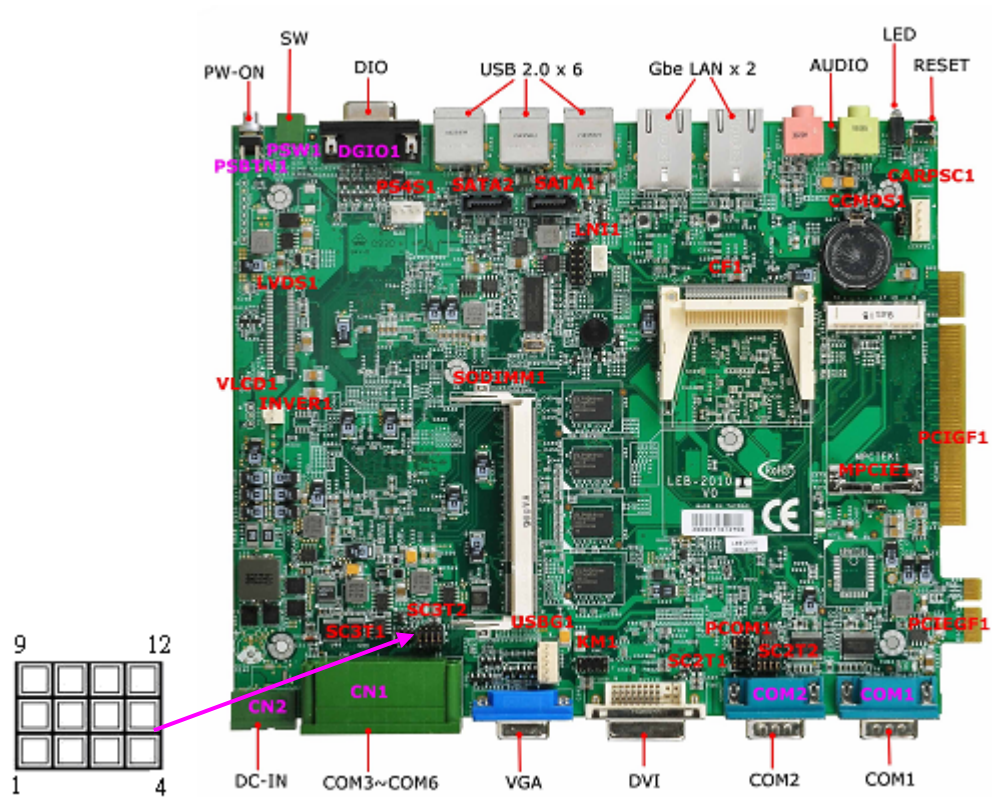
2.2.3.6 SODIMM1: 200 PIN DDR2 SODIMM SOCKET



Pin No	Signal	Pin No	Signal	Pin No	Signal	Pin No	Signal
1	VREF	2	VSS46	3	VSS47	4	DQ4
5	DQ0	6	DQ5	7	DQ1	8	VSS15
9	VSS37	10	DM0	11	DQS#0	12	VSS5
13	DQS0	14	DQ6	15	VSS48	16	DQ7
17	DQ2	18	VSS16	19	DQ3	20	DQ12
21	VSS38	22	DQ13	23	DQ8	24	VSS17
25	DQ9	26	DM1	27	VSS49	28	VSS53
29	DQS#1	30	CK0	31	DQS1	32	CK0#
33	VSS39	34	VSS41	35	DQ10	36	DQ14
37	DQ11	38	DQ15	39	VSS50	40	VSS54
41	VSS18	42	VSS20	43	DQ16	44	DQ20
45	DQ17	46	DQ21	47	VSS1	48	VSS6
49	DQS#2	50	NC3	51	DQS2	52	DM2
53	VSS19	54	VSS21	55	DQ18	56	DQ22
57	DQ19	58	DQ23	59	VSS22	60	VSS24
61	DQ24	62	DQ28	63	DQ25	64	DQ29
65	VSS23	66	VSS25	67	DM3	68	DQS#3
69	NC4	70	DQS3	71	VSS9	72	VSS10
73	DQ26	74	DQ30	75	DQ27	76	DQ31
77	VSS4	78	VSS8	79	CKE0	80	CKE1
81	VDD7	82	VDD8	83	NC1	84	A15
85	A16_BA2	86	A14	87	VDD9	88	VDD11

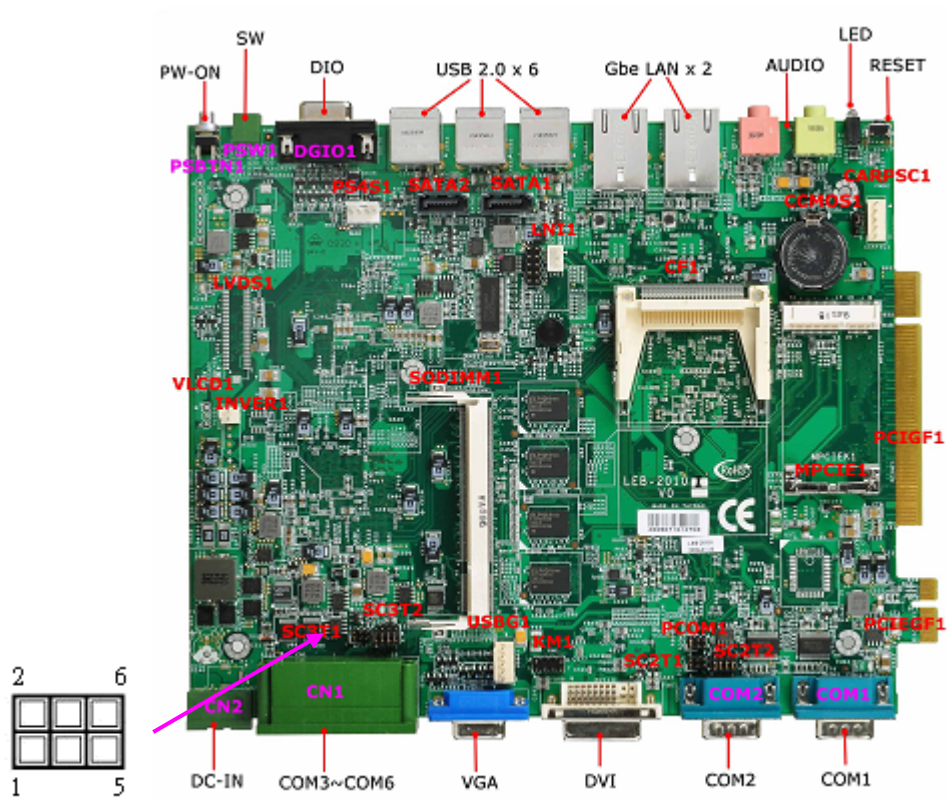
Pin No	Signal	Pin No	Signal	Pin No	Signal	Pin No	Signal
89	A12	90	A11	91	A9	92	A7
93	A8	94	A6	95	VDD5	96	VDD4
97	A5	98	A4	99	A3	100	A2
101	A1	102	A0	103	VDD10	104	VDD12
105	A10/AP	106	BA1	107	BA0	108	RAS#
109	WE#	110	S0#	111	VDD2	112	VDD1
113	CAS#	114	ODT0	115	S1#	116	A13
117	VDD3	118	VDD6	119	ODT1	120	NC2
121	VSS11	122	VSS12	123	DQ32	124	DQ36
125	DQ33	126	DQ37	127	VSS26	128	VSS28
129	DQS#4	130	DM4	131	DQS4	132	VSS42
133	VSS2	134	DQ38	135	DQ34	136	DQ39
137	DQ35	138	VSS55	139	VSS27	140	DQ44
141	DQ40	142	DQ45	143	DQ41	144	VSS43
145	VSS29	146	DQS#5	147	DM5	148	DQS5
149	VSS51	150	VSS56	151	DQ42	152	DQ46
153	DQ43	154	DQ47	155	VSS40	156	VSS44
157	DQ48	158	DQ52	159	DQ49	160	DQ53
161	VSS52	162	VSS57	163	NCTEST	164	CK1
165	VSS30	166	CK1#	167	DQS#6	168	VSS45
169	DQS6	170	DM6	171	VSS31	172	VSS32
173	DQ50	174	DQ54	175	DQ51	176	DQ55
177	VSS33	178	VSS35	179	DQ56	180	DQ60
181	DQ57	182	DQ61	183	VSS3	184	VSS7
185	DM7	186	DQS#7	187	VSS34	188	DQS7
189	DQ58	190	VSS36	191	DQ59	192	DQ62
193	VSS14	194	DQ63	195	SDA	196	VSS13
197	SCL	198	SA0	199	VDD(SPD)	200	SA1

2.2.3.7 SC3T2: Select COM3 Type Jumper



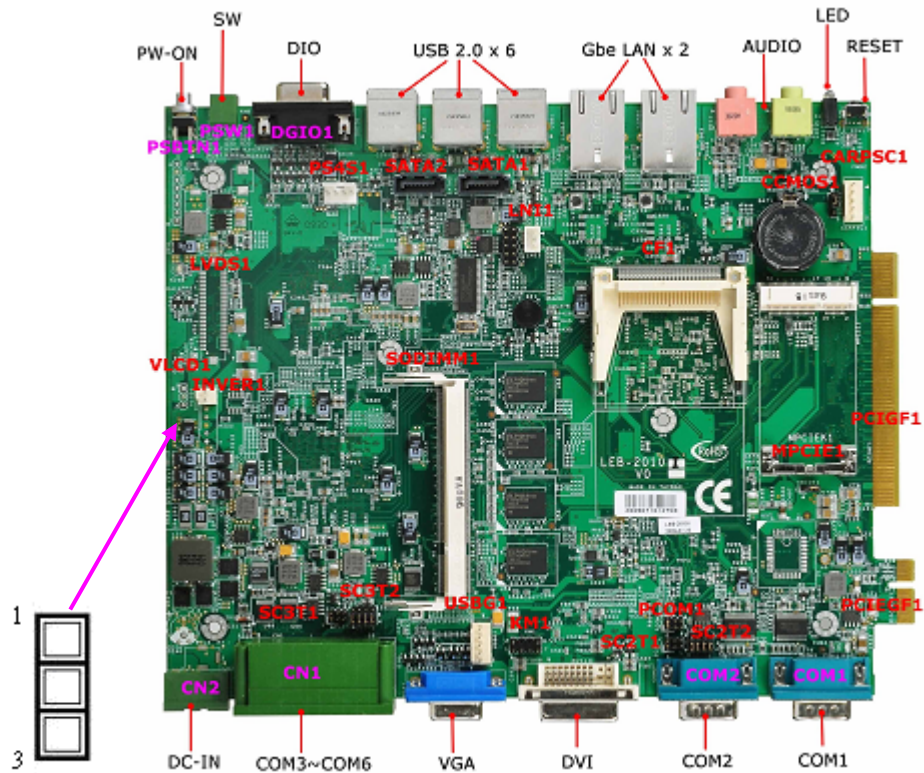
COM3 TYPE	SC3T1	SC3T2
RS-232 (Default)	1-2	1-5,2-6,3-7,4-8
RS-422	3-4	5-9,6-10,7-11,8-12
RS-485	5-6	5-9,6-10,7-11,8-12

2.2.3.8 SC3T1: Select COM3 Type Jumper



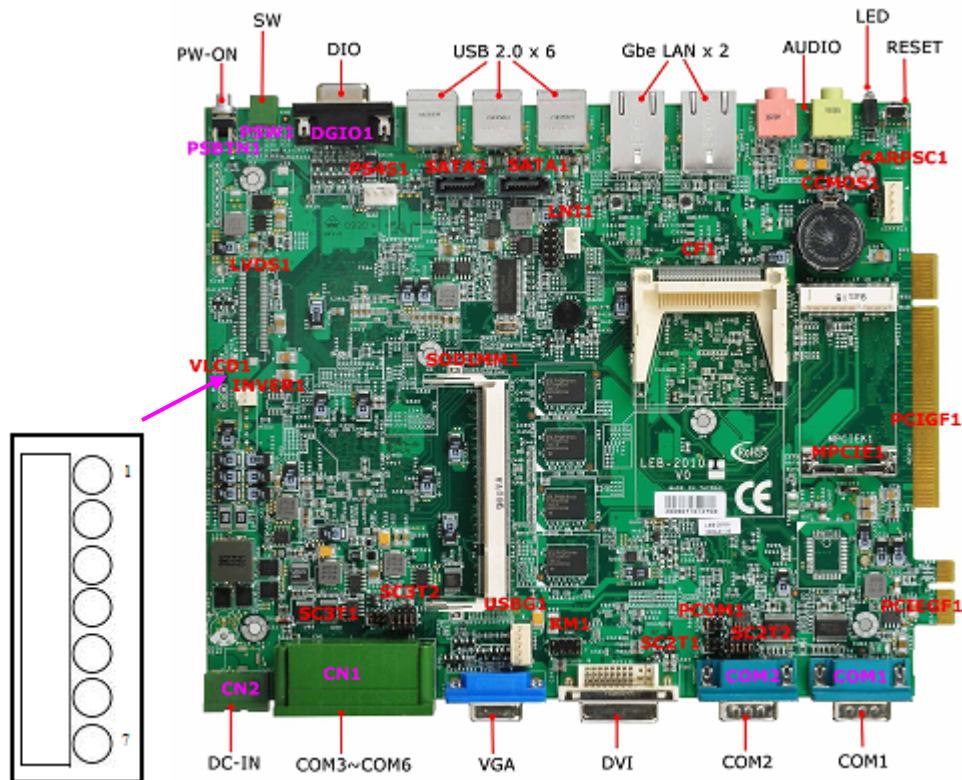
COM3 TYPE	SC3T1	SC3T2
RS-232 (Default)	1-2	1-5,2-6,3-7,4-8
RS-422	3-4	5-9,6-10,7-11,8-12
RS-485	5-6	5-9,6-10,7-11,8-12

2.2.3.9 VLCD1: Select Panel Voltage Header (Reserved)



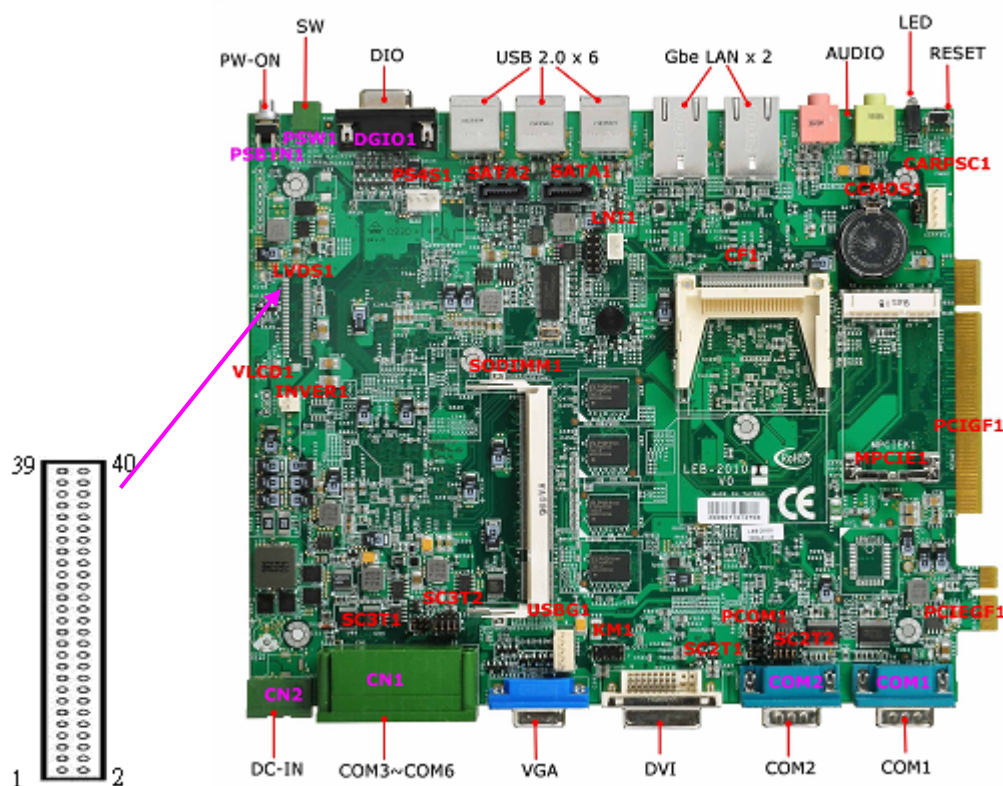
Panel Voltage	VLCD1
+3.3V (Default)	1-2
+5V	2-3

2.2.3.10 INVER1 : 7 Pin LCD INVETER Connector (Optional)



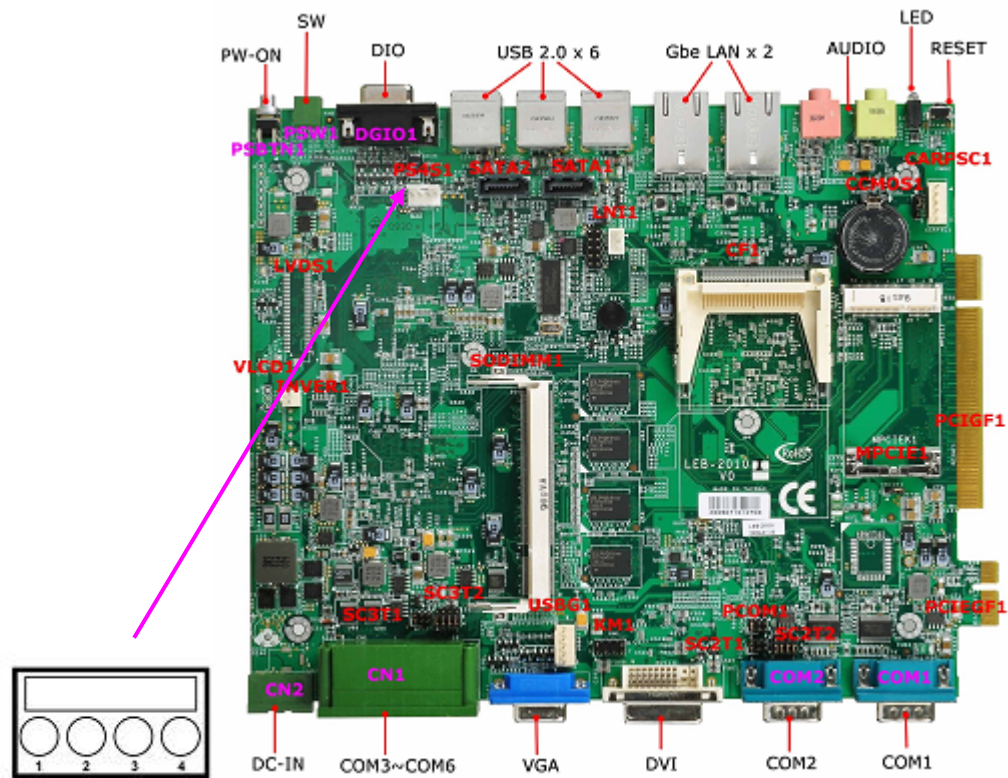
Pin No.	Description
1	+5V
2	GND
3	+12V
4	+12V
5	GND
6	Bright
7	ENBKL

2.2.3.11 LVDS1: LVDS Connector (2Channel 18bits 2x20 1.25mm Connector /Optional)



Pin No.	Description		Pin No.	Description	
	LEB-2010I	PANEL		LEB-2010I	PANEL
1	PVDD		2	+12V	
3	LCDAD0#		4	LCDBD0#	
5	LCDAD0		6	LCDBD0	
7	PVDD		8	+12V	
9	LCDAD1#		10	LCDBD1#	
11	LCDAD1		12	LCDBD1	
13	GND		14	GND	
15	LCDAD2#		16	LCDBD2#	
17	LCDAD2		18	LCDBD2	
19	GND		20	GND	
21	NC		22	NC	
23	NC		24	NC	
25	LACLK1#		26	LBCLK2#	
27	LACLK1		28	LBCLK2	
29	ENBLD1		30	BLCTR	
31	GND		32	GND	
33	NC		34	NC	
35	NC		36	GND	
37	NC		38	SPDAT	
39	GND		40	SPCLK	

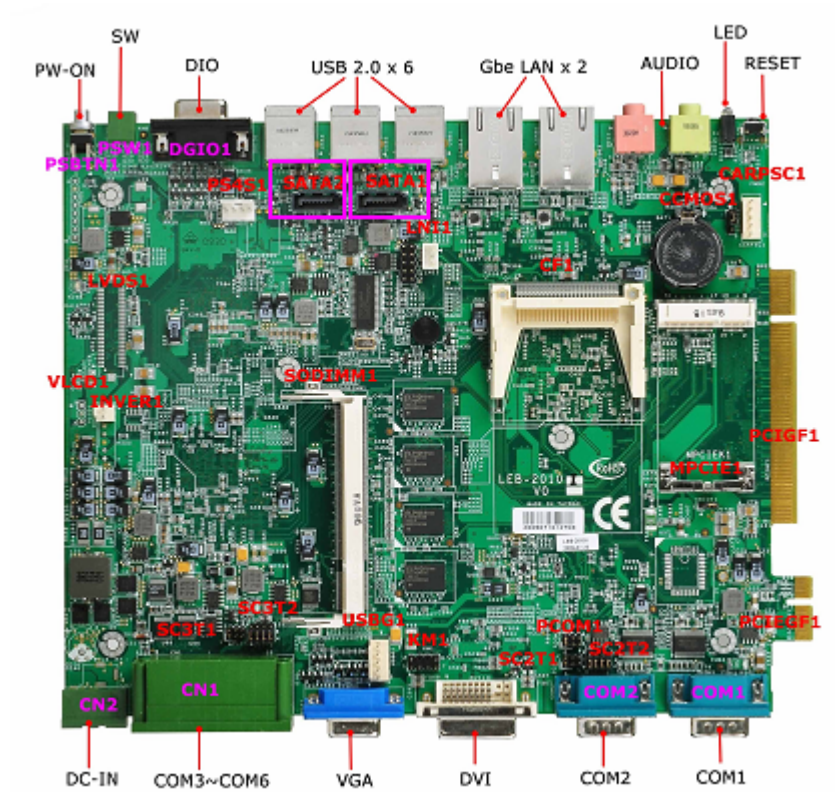
2.2.3.12 PS4S1: 4-Pin Power Connector (4P Male)



Pin No.	Description
1	+5V
2	GND
3	GND
4	+12V

Note: Only support one 2.5" HDD.

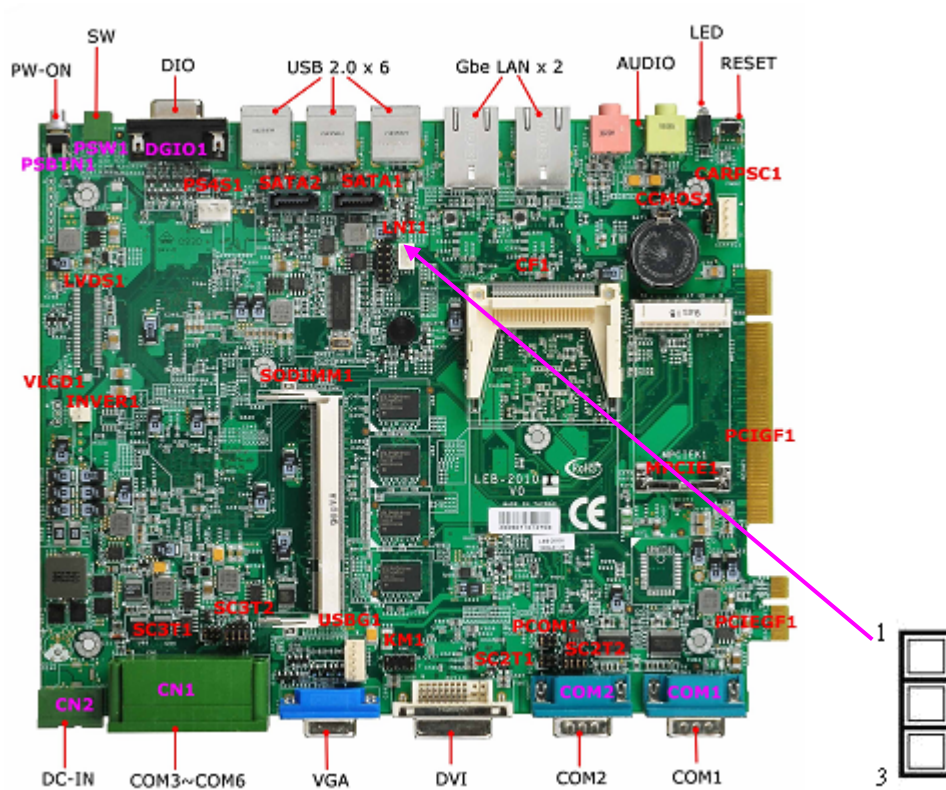
2.2.3.13 SATA1/2: Serial ATA-SATA Socket



Pin No.	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

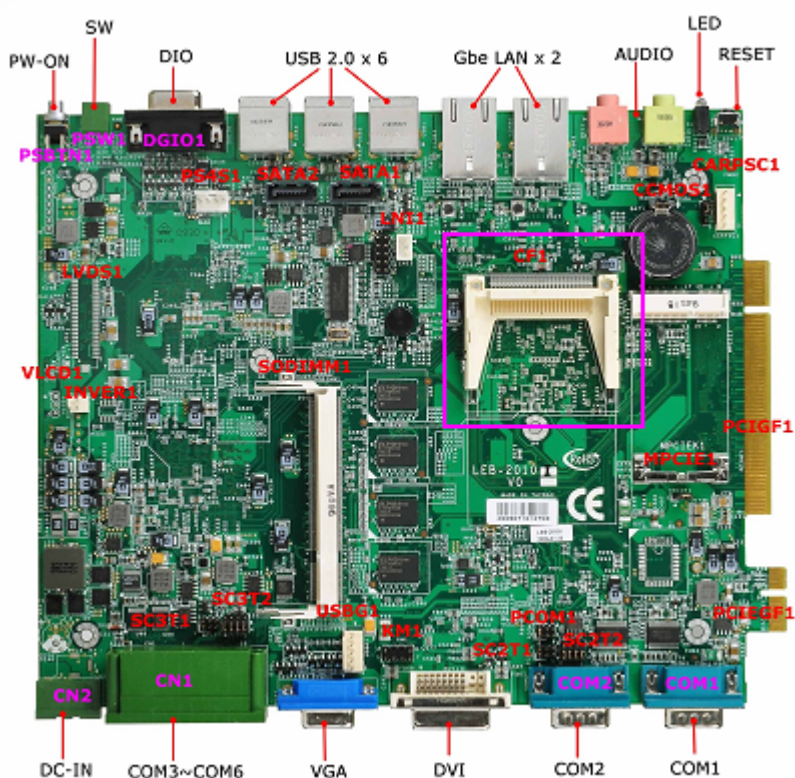
**Note: When you connect SATA cable, the Pin 7 of cable will automatically switch to GND.
(Normal Pin7 is +5V for SATA-DOM)**

2.2.3.14 LNI1 : Line In 3Pin Connector



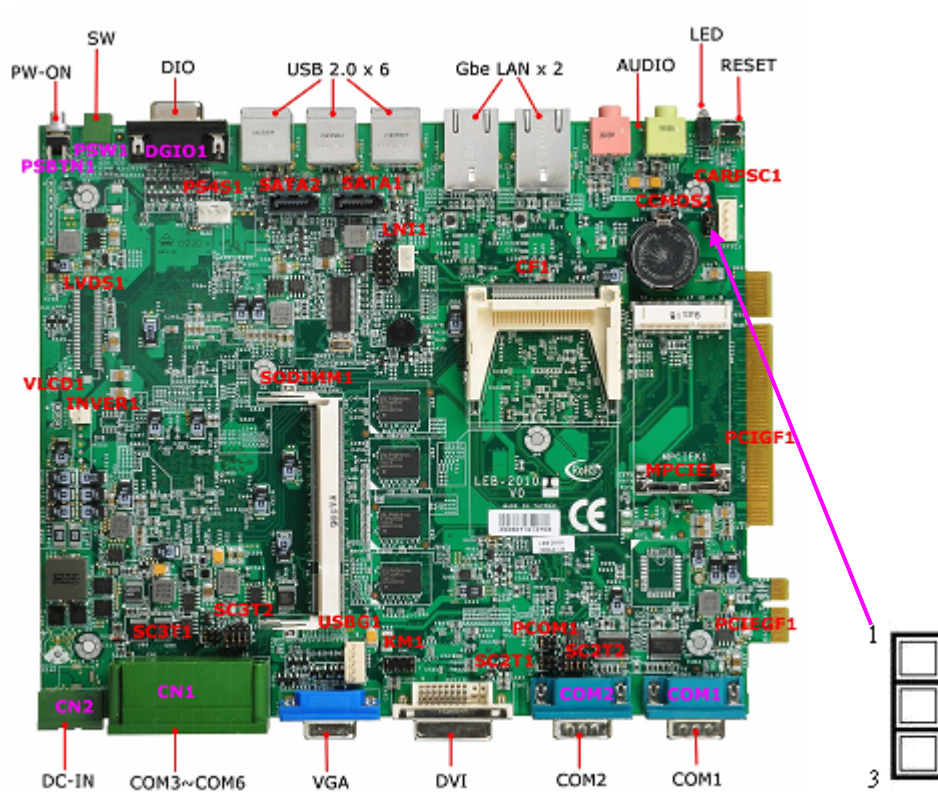
Pin No.	Description
1	LIN-L
2	CO_GND
3	LIN-R

2.2.3.15 CF1: Compact Flash Connector



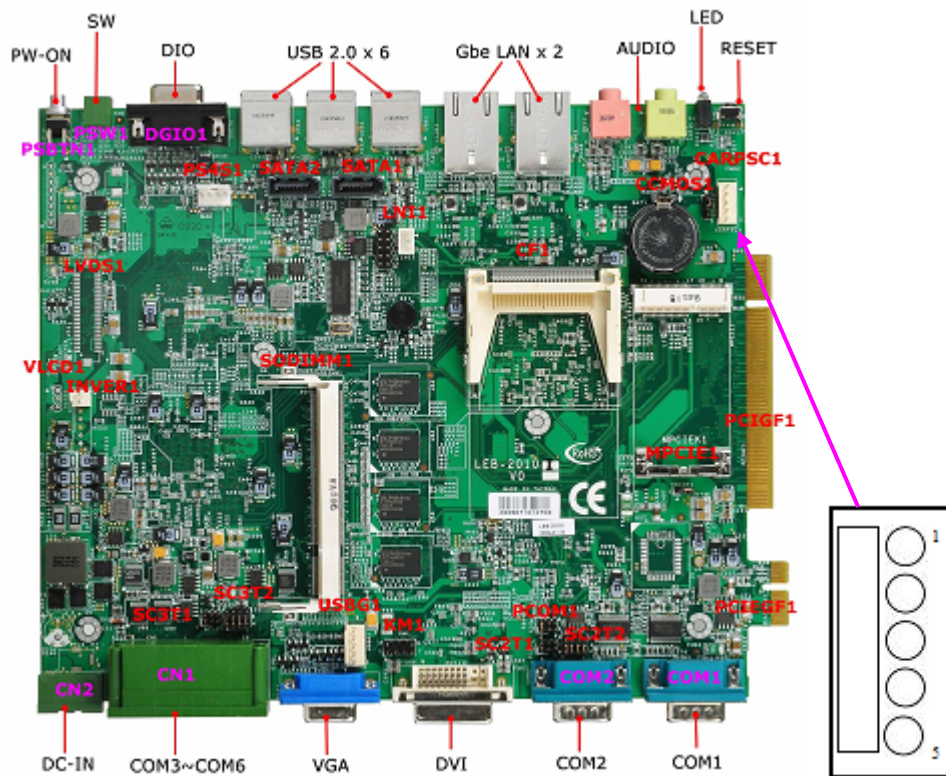
Pin No.	Description	Pin No.	Description
1	GND	26	CD1-
2	DATA3	27	DATA11
3	DATA4	28	DATA12
4	DATA5	29	DATA13
5	DATA6	30	DATA14
6	DATA7	31	DATA15
7	CE1#	32	CE2#
8	A10	33	VS1#
9	OE#	34	IOR#
10	A9	35	IOW#
11	A8	36	WE#
12	A7	37	READY#
13	CFVCC3	38	CFVCC3
14	A6	39	CSEL
15	A5	40	VS2#
16	A4	41	RESET
17	A3	42	WAIT#
18	A2	43	INPACK#
19	A1	44	REG#
20	A0	45	DASP#
21	DATA0	46	DIAG#
22	DATA1	47	DATA8
23	DATA2	48	DATA9
24	WP	49	DATA10
25	CD2-	50	GND

2.2.3.16 CCMOS1 : Clear CMOS Data Jumper



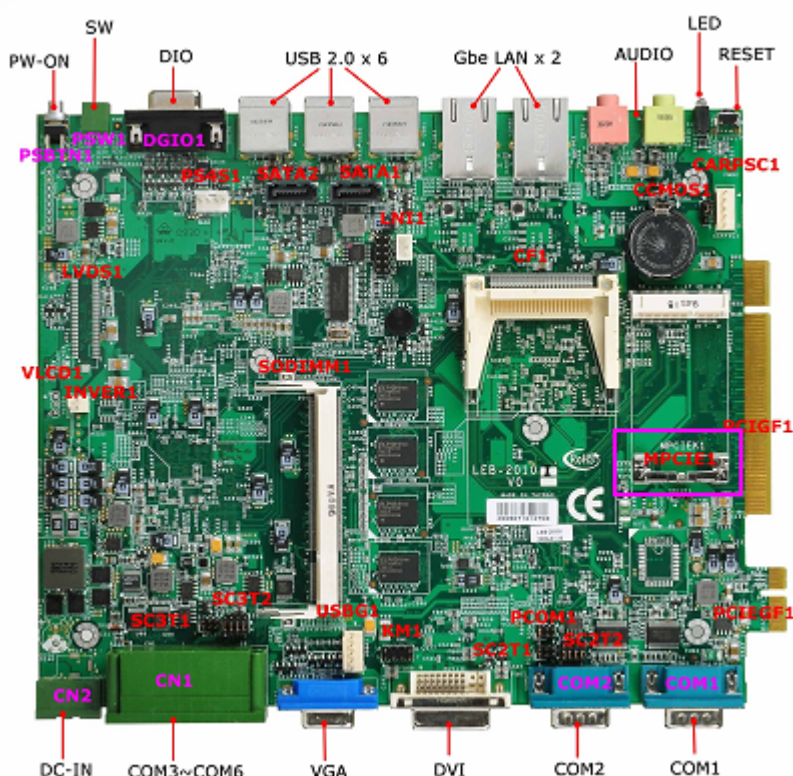
Description	CCMOS1
Normal (Default)	1-2
Clear CMOS	2-3

2.2.3.17 CARPSC1: Car Application 5-Pin Power Connector (5P Male/ Reserve for LEC-5011)



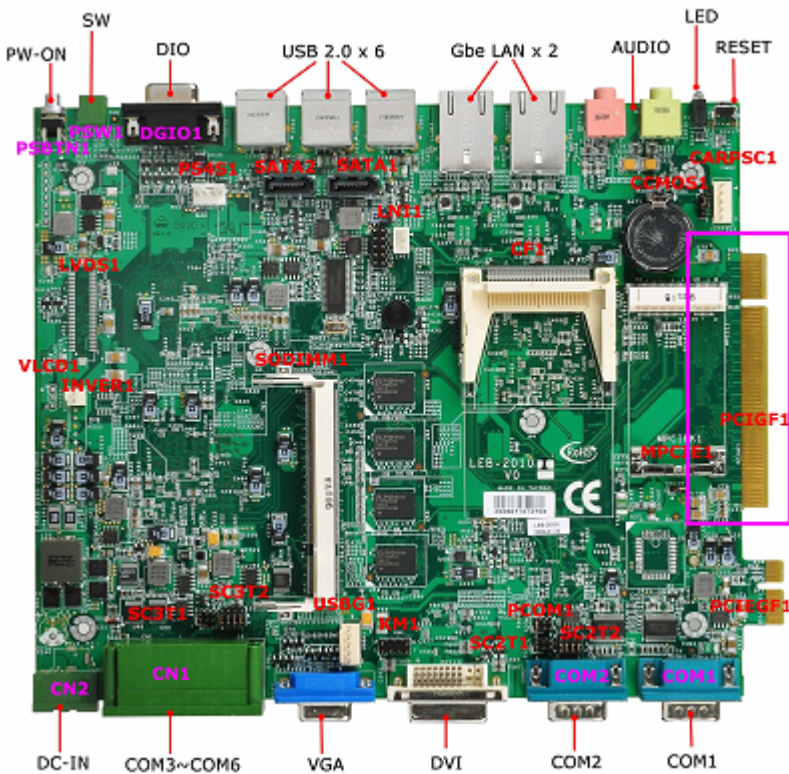
Pin No.	Description
1	Button-
2	Ground
3	SYS_RST#
4	Ground
5	VCC5

2.2.3.18 MPCIE1: Mini PCI Express 1X Connector



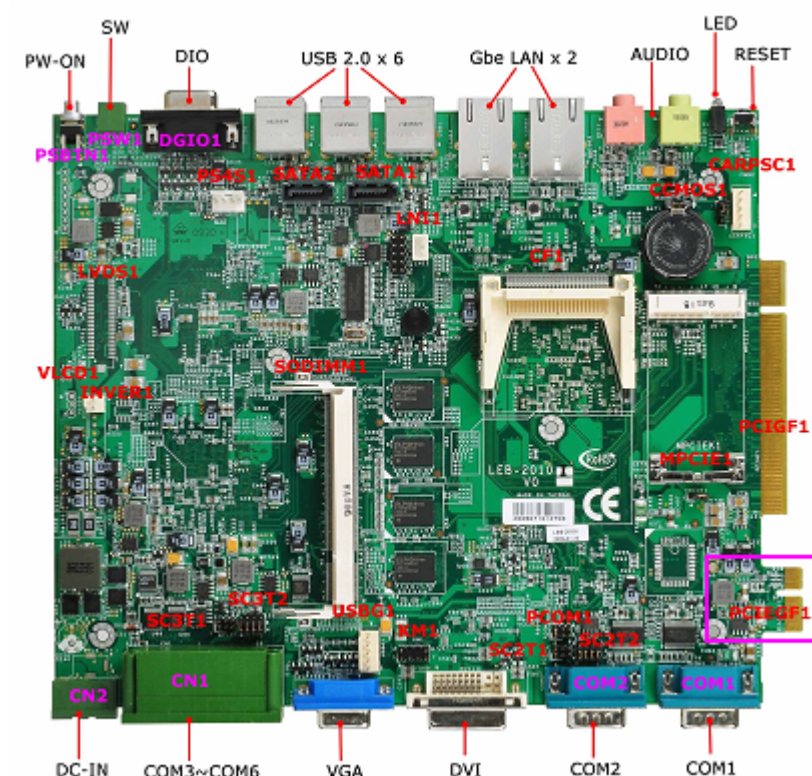
Pin No.	Description	Pin No.	Description
1	WAKE#	2	+3.3V
3	RSV1	4	Ground
5	RSV2	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	Ground	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND3	16	UIM_VPP
KEY		KEY	
17	RSV3	18	Ground
19	RSV4	20	W_DISABLE#
21	GND5	22	PERST#
23	PERn0	24	+3.3Vaux
25	PERp0	26	Ground
27	Ground	28	+1.5V
29	Ground	30	SMB_SLK
31	PETn0	32	SMB_DATA
33	PETp0	34	Ground
35	Ground	36	USB_D-
37	RSV5	38	USB_D+
39	RSV6	40	Ground
41	RSV7	42	LED_WWAN#
43	RSV8	44	LED_WLAN#
45	RSV9	46	LED_WPAN#
47	RSV10	48	+1.5V
49	RSV11	50	Ground
51	RSV12	52	+3.3V

2.2.3.19 PCIGF1: 120 Pin PCI G Golden Finger



Pin No.	System Environment		Pin No.	System Environment	
	Side B	Side A		Side B	Side A
1	-12V	TRST# (Ground)	32	AD [17]	AD [16]
2	TCK (Ground)	+12V	33	C/BE [2] #	+3.3V
3	Ground	TMS (Ground)	34	Ground	FRAME#
4	TDO	TDI (Ground)	35	IRDY#	Ground
5	+5V	+5V	36	+3.3V	TRDY#
6	+5V	INTA#	37	DEVSEL#	Ground
7	INTB#	INTC#	38	Ground	STOP#
8	INTD#	+5V	39	LOCK#	+3.3V
9	PRSENT1#	Reserved	40	PERR#	SDONE (SMBclk)
10	Reserved(PREQ-1)	VI/O (NC)	41	+3.3V	SBO# (SMBdata)
11	PRSENT2#	Reserved	42	SERR#	Ground
12	Ground	Ground	43	+3.3V	PAR
13	Ground	Ground	44	C/BE [1] #	AD [15]
14	Reserved(PCLK2)	3.3Vaux/PGNT-1	45	AD [14]	+3.3V
15	Ground	RST#	46	Ground	AD [13]
16	CLK	VI/O (NC)	47	AD [12]	AD [11]
17	Ground	GNT# (PGNT-0)	48	AD [10]	Ground
18	REQ# (PREQ-0)	Ground	49	M66EN (Ground)	AD [09]
19	VI/O (NC)	PME#	50	KEY	KEY
20	AD [31]	AD [30]	51	KEY	KEY
21	AD [29]	+3.3V	52	AD [08]	C/BE [0] #
22	Ground	AD [28]	53	AD [07]	+3.3V
23	AD [27]	AD [26]	54	+3.3V	AD [06]
24	AD [25]	Ground	55	AD [05]	AD [04]
25	+3.3V	AD [24]	56	AD [03]	Ground
26	C/BE [3] #	IDSEL (AD16)	57	Ground	AD [02]
27	AD [23]	+3.3V	58	AD [01]	AD [00]
28	Ground	AD [22]	59	VI/O (NC)	VI/O (NC)
29	AD [21]	AD [20]	60	ACK64#	REQ64#
30	AD [19]	Ground	61	+5V	+5V
31	+3.3V	AD [18]	62	+5V	+5V

2.2.3.20 PCIEGF1: PCI Express 1x Golden Finger



Pin No.	Side B	Side A
1	12V	PRSNT1#
2	12V	12V
3	12V	12V
4	Ground	Ground
5	SMBCLK	JTAG2
6	SMBDATA	JTAG3
7	Ground	JTAG4
8	+3.3V	JTAG5
9	JTAG1	+3.3V
10	+3.3VAUX	+3.3V
11	WAKE#	PCIE_RESET-
	KEY	KEY
12	Reserved	Ground
13	Ground	DEFCLK+
14	PE_TX0+	DEFCLK-
15	PE_TX0-	Ground
16	Ground	PE_RX0+
17	PRSNT2#	PE_RX0-
18	Ground	Ground

2.2.3.21 Serial Port COM1/2 Connector (COM1, COM2)



Pin No.	Description		
TYPE	RS-232	RS-422	RS-485
1	Data Carrier Detect (DCDA #)	422TX+	DATA+
2	Receive Data (RXDA)	422TX-	DATA-
3	Transmit Data (TXDA)	422RX+	
4	Data Terminal Ready (DTRA #)	422RX-	
5	Ground (GND)		
6	Data Set Ready (DSRA #)		
7	Request To Send (RTSA #)		
8	Clear To Send (CTSA #)		
9	Ring Indicator (RIA #)		

Note: COM1:RS-232 Only; COM2:RS-232,RS422,RS485

2.2.3.22 COM3 ~ 6 Connector (CN1)



Pin No.	COM3					COM4				
	20	19	18	17	16	15	14	13	12	11
RS-232	RTS3#	SIN3	SOUT3	CTS3#	GND	RTS4#	SIN4	SOUT4	CTS4#	GND
RS-422	TX+	TX-	RX+	RX-	GND					
RS-485 4-wire	TX+	TX-	RX+	RX-	GND					
RS-485 2-wire	DATA+	DATA-	NC	NC	GND					
Pin No.	COM5					COM6				
	10	9	8	7	6	5	4	3	2	1
RS-232	RTS5#	SIN5	SOUT5	CTS5#	GND	RTS6#	SIN6	SOUT6	CTS6#	GND

Note: Only COM3 can select RS-232/RS-422/RS-485

Pin1~5: COM6 , Pin6~10: COM5 , Pin11~15: COM4 , Pin16~20: COM3

2.2.3.23 DC-IN Connector (CN2)



Pin No.	Description
1	GND
2	DC IN

2.2.3.24 DIO Connector/D-SUB9 Female (DGI01)



Pin No.	Description
1	Digital IN 0
2	Digital IN 1
3	Digital IN 2
4	Digital IN 3
5	Ground
6	Digital Out 0
7	Digital Out 1
8	Digital Out 2
9	Digital Out 3

2.2.3.25 SW Connector (PSW1)



Pin No.	Description
1	Button-
2	GND

Note: ATX Power Switch Connector

2.2.3.26 PW-ON Button (PSBIN1)



Pin No.	Description	PIN	Description
PAD1	Ground	PAD2	Ground
1	Ground	3	BUTTON-
2	Ground	4	BUTTON-
L1	PWR_LED+ / STB_LED-	L2	PWR_LED- / STB_LED+

Note: Power ON: Green LED ; Standby: Red LED

2.2.3.27 MIC IN Connector/5Pin-PHONE Jack (MIC1)



Pin No.	Description
1	CO_GND
2	MIC_INL
3	CO_GND
4	MIC-JDET
5	MIC_INR

2.2.3.28 LINE OUT Connector/5Pin-PHONE Jack (LNO1)



Pin No.	Description
1	CO_GND
2	LINOUT-L
3	CO_GND
4	LINOUT-JDET
5	LINOUT- R

3. Hardware Installation Guide

3.1 LEC-2010 Embedded System

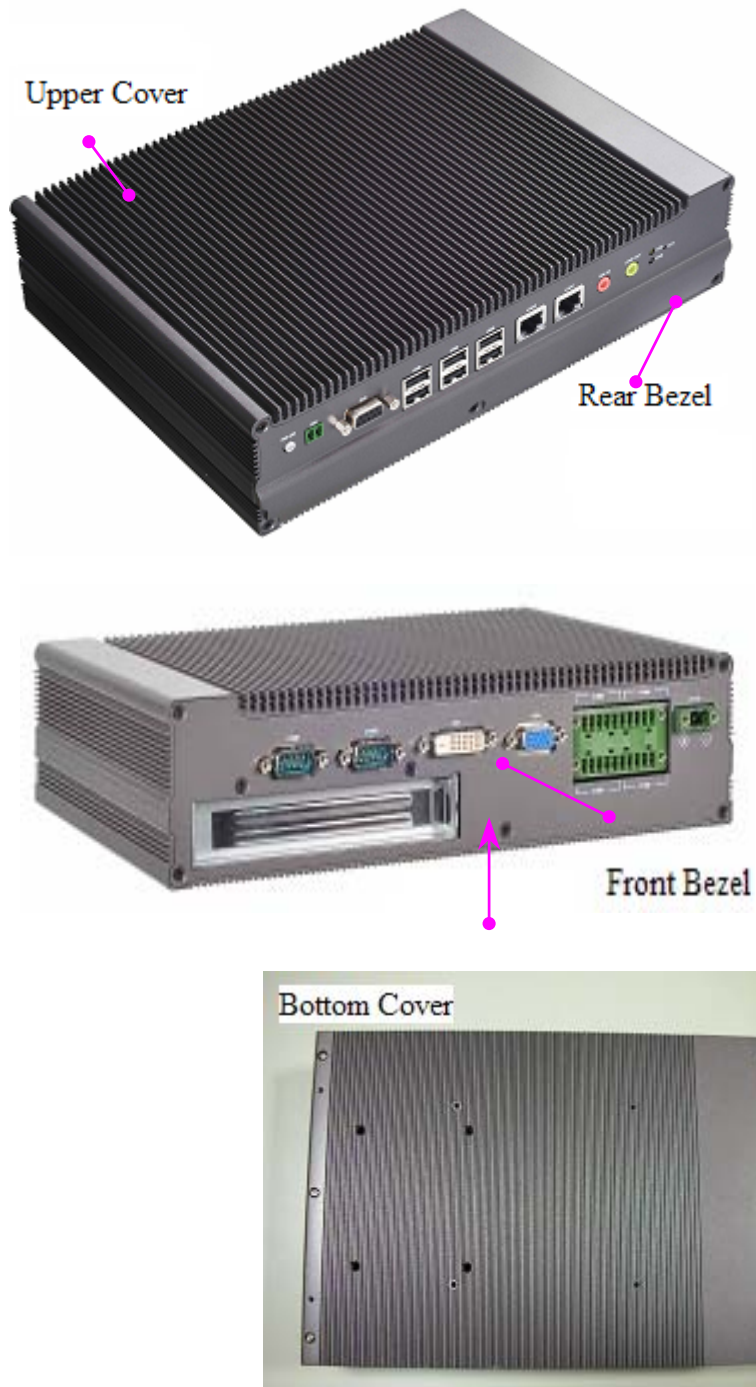


Figure 7 – LEC-2010 Embedded System Outlook

3.1.1 Begin Installation

1. Unscrew the 5 thumbscrews and 2 spacers at the rear bezel



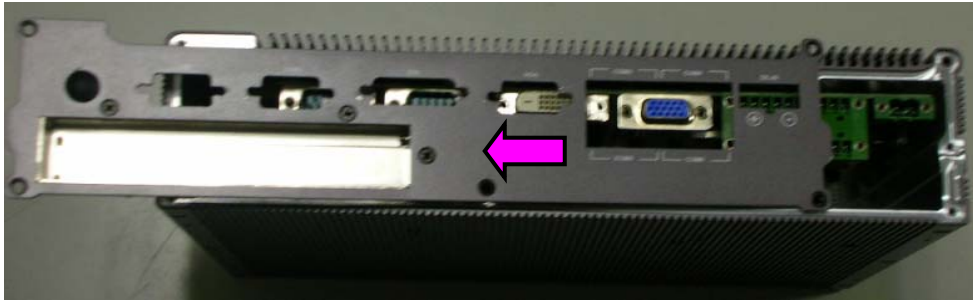
2. Remove the rear Bezel



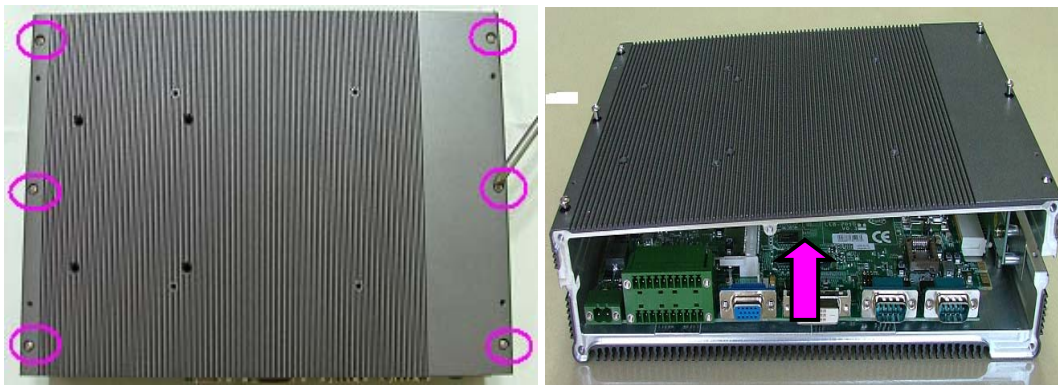
3. Unscrew the 5 thumbscrews and 8 spacers at the front bezel



4. Remove the rear Bezel



5. Unscrew the 6 thumbscrews at the bottom cover than remove the bottom cover



Note: For Safety reasons, please ensure that the power cord is disconnected before opening the case.

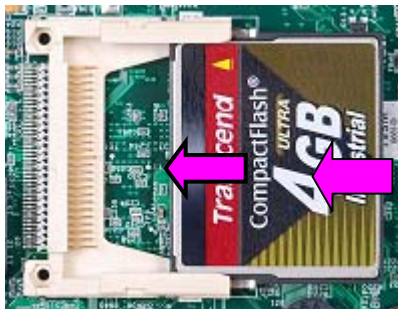
3.1.2 System Memory Installation



Insert the memory module into the socket and push firmly until it is fully seated.

Note: The maximum capacity of DDR2 memory module is 1GB.

3.1.3 CompactFlash Card Installation



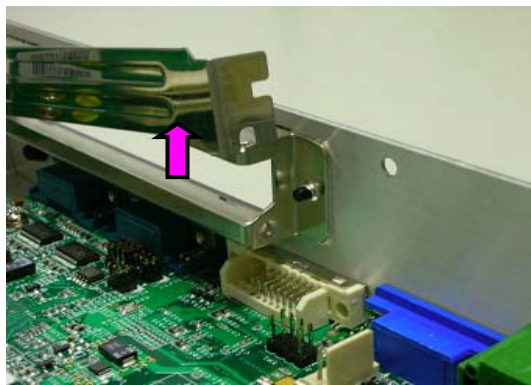
Carefully insert the CompactFlash card into the slot as shown in the illustration above.

3.1.4 PCI Module Installation

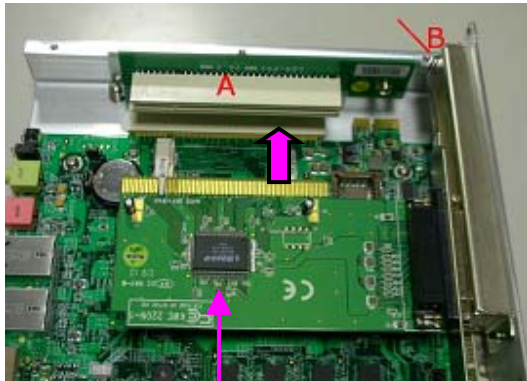
1. Replace the front bezel on the system and then refasten the 2 thumbscrews



2. Unscrew the screw and then remove the PCI bezel



3. Installing PCI module into PCI riser card



4. Refasten the screw



5. PCI module installation is now complete



3.1.5 LEC-2010 Hard Disk Installation

*HDD packing:

- Spacer x 4
- HDD Screw x 4
- Serial ATA/Power Cable x 1



HDD Screw

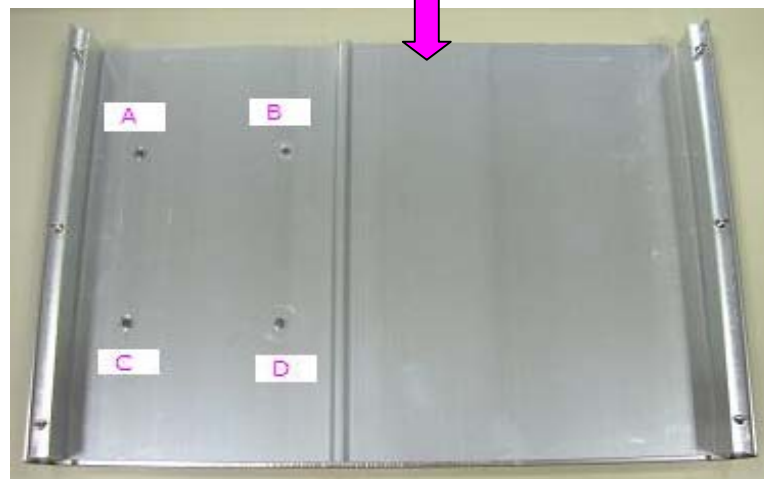


Note: Please install 2.5" HDD

1. Invert Bottom Aluminum cover (Inverted)



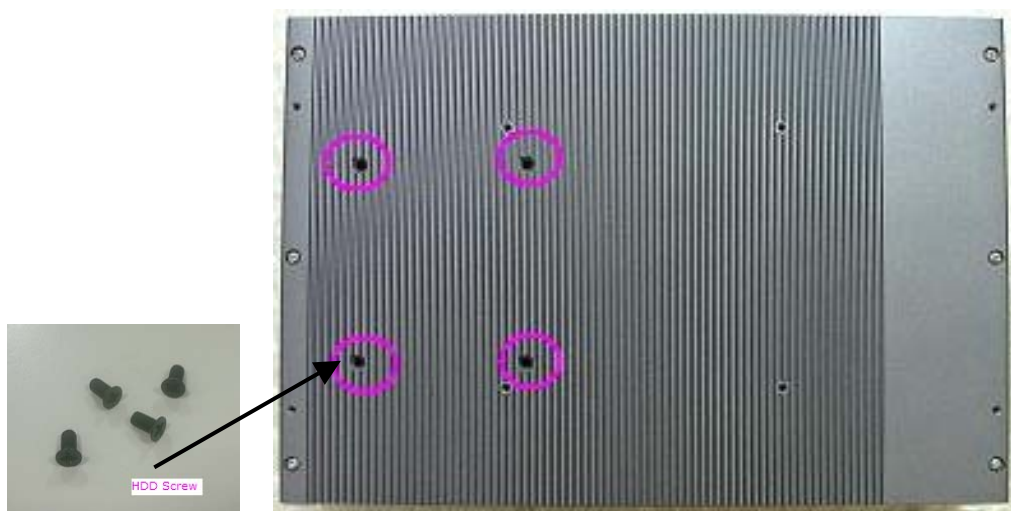
*Inside View of the bottom cover



2. Position the Hard Disk on the bottom cover properly so that the screw holes of the Hard Disk can match the holes with the cover for installation.



3. Begin to secure the hard disk with the 4 HDD screws on the right side of the bottom cover



**Secure with 4 HDD screws on the right side of bottom cover*

4. Connect the Serial ATA/Power Cable to the HDD



**Serial ATA/Power Cable*

5. Plug the Serial ATA cable to the SATA Connector (SATA1 or SATA2)



**Plug the Serial ATA cable to the SATA Connector*

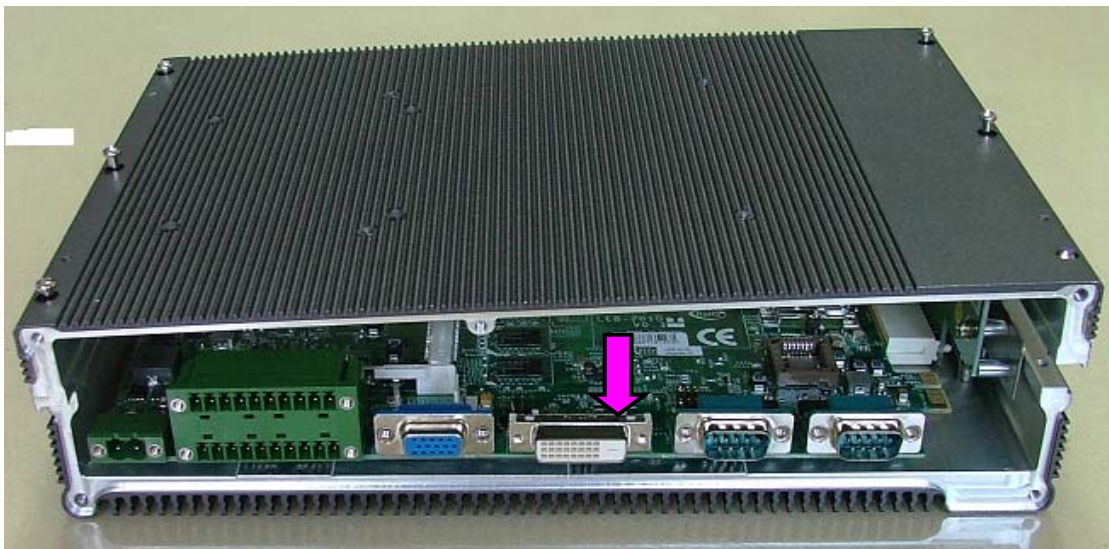
6. Plug the Power cable to the 4-Pin Power Connector (PS4S1)



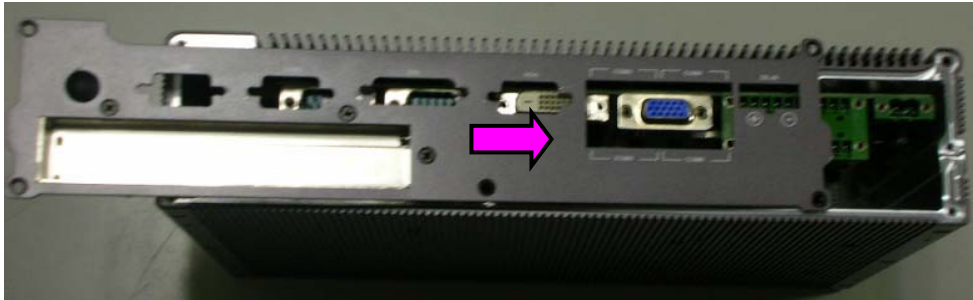
3.1.6 System Installation is now Complete

1. Replace the bottom cover

(Please don't refasten the thumbscrews at bottom cover)



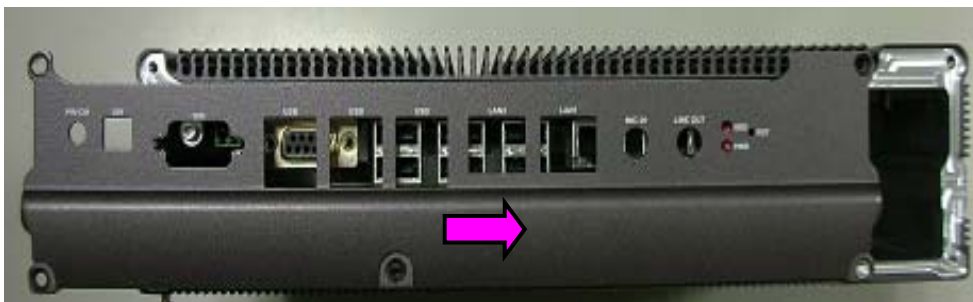
2. Replace the front bezel on the system



3. Refasten the 5 thumbscrews and 8 spacers at the front bezel



4. Replace the rear bezel on the system



5. Refasten the 5 thumbscrews and 2 spacers at the rear bezel



6. Refasten the 6 thumbscrews at the bottom cover than the LEC-2010 Embedded System Installation is completed



****Note: Please load the optimized BIOS values ****

3.2 Mounting Kits

3.2.1 Wall Mount View

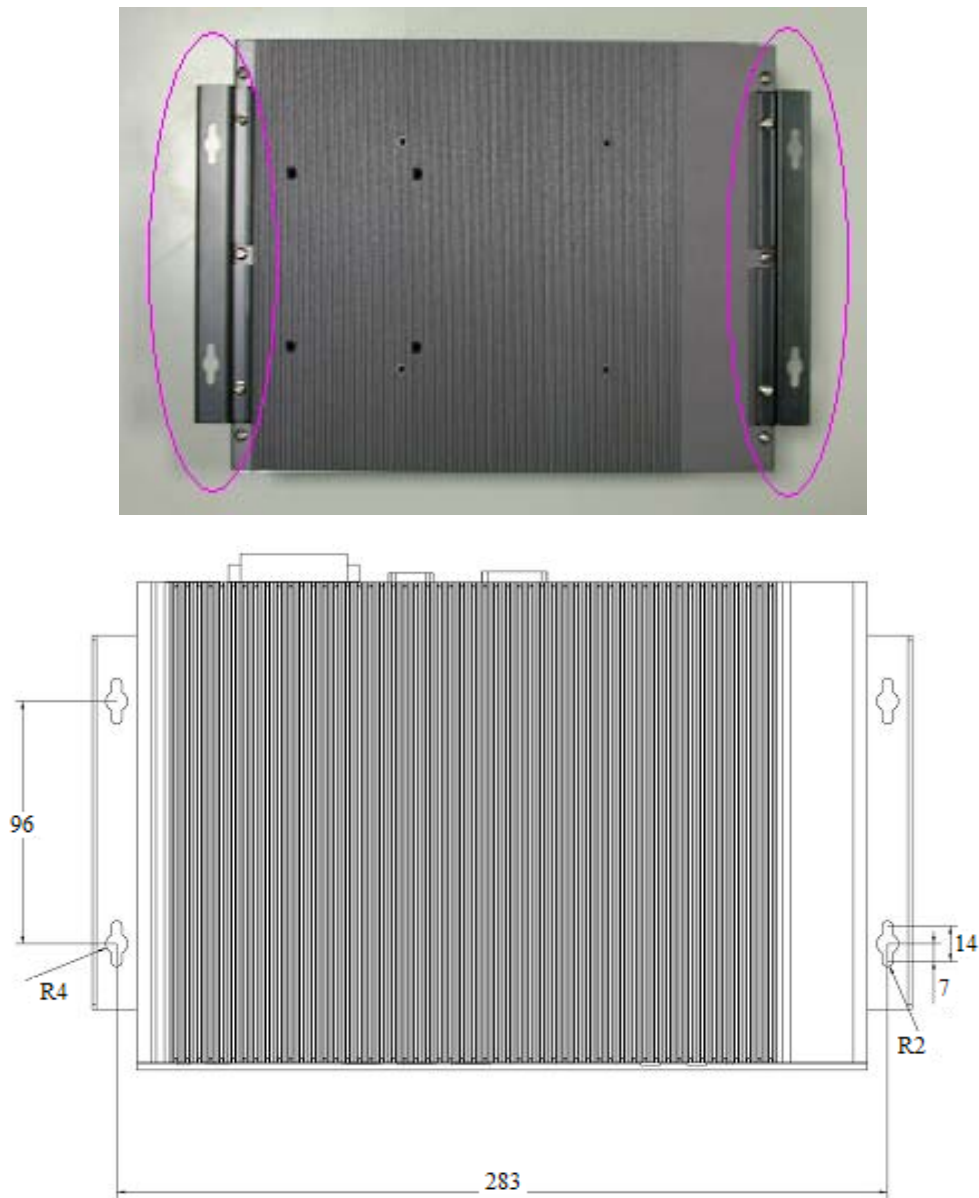


Figure 9 – LEB-2010 System Board

3.2.2 Wall Mount Package and Ordering Information

Package Contents	Q'ty	Photo	Ordering Information
Wall Mount Screw (M3x6 Ni)	4		*P/N:070W103000601
Wall Mount Kits	1		*P/N:SE9ESA829R110

A. Appendix A: LED Indicators

A.1 LAN Port LED



Link/Active (Left LED)		
Status	Description	LED/Color
On	LAN is link to 10 or 100 or 1000Mbps	Yellow
Blink	LAN port is receiving and transmitting packets.	Yellow

Speed (Right LED)		
Status	Description	LED/Color
Off	LAN is link to 10Mbps	Dark
On	LAN is link to 100Mbps	Green
On	LAN is link to 1000Mbps	Yellow

A.2 Power-on Button LED



Color	Status
Red	Standby
Green	Power-on

A.3 HDD LED



Color	Status
Yellow	Storage Access

A.4 POWER LED



Color	Status
Yellow	Storage Access

B. Appendix B: Watchdog Timer

B.1 Introduction

systems need to be self-reliant. If an error should occur it is typically not possible to wait for the system to be rebooted manually. In some cases, such as space probes, the system is simply not accessible to human operators. If such systems should ever hang, they would be permanently disabled. In other cases, the speed at which a human operator would reset the system would be too slow to meet the uptime requirements of the product.

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in the case any problems are found. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is presumed to be malfunctioning, and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.

B.2 Detail Register Descriptions

A watchdog action consists of a series of watchdog instructions. A watchdog instruction is the operation on a register region. This section describes the detail register in LPD I/O (W83697UHG)

B.2.1 To use the watch-dog timer

For DOS system:

Execute the WD.EXE file under DOS (WD.EXE and CWSDPMI.EXE should be placed on same directory), then key-in 0~255. The system will reboot automatically according to the time-out you set.

Watch Dog sample code:

```
#include <stdio.h>
#include <string.h>
#include <dos.h>
#include <stdlib.h>
#include <inlines/pc.h>

#define INDEX_PORT 0x2e
#define DATA_PORT 0x2f

void help()
{
    printf("Watchdog timer control for EM-9345\n\n");
    printf("wd.exe -wr xxx (1-255 sec)(Watchdog Control - SYSTEM RESET)\n");
    printf("\n");
}

int main(int argc, char *argv[])
{
    int temp, time;

    if( argc < 2 )
    {
```

```

help();
return -1;
}

if( strcmp(argv[1], "-wr") == 0 )
{
if( argc != 3 )
{
    help();
    return -1;
}
write_w83627_reg(0x8, 0xf6, 0); //LDN=8, CRF6, stop timer first
//clear status bit
write_w83627_reg(0x8, 0xf7, read_w83627_reg(0x8, 0xf7) & 0xef);
    time = atoi(argv[2]);
printf("Setting Watchdog timer for System Reset...\n");
    set_watchdog(time);
    return 0;
}
else
{
    help();
return -1;
}
return 0;
}
int set_watchdog(int time)
{
    int temp;
    outportb(INDEX_PORT, 0x87);
    delay(1);
    outportb(INDEX_PORT, 0x87); //Entering
W83627HF Configuration

    temp = read_w83627_reg(0, 0x2b); //LDN=0, CR2B
    temp &= 0xf3;
    temp |= 0x04;
    write_w83627_reg(0, 0x2b, temp); //set watchdog pin
    write_w83627_reg(0x8, 0xf6, 0); //LDN=8, CRF6, stop timer first
    write_w83627_reg(0x8, 0xf5, read_w83627_reg(0x8, 0xf5) & 0xf7); //set
second
    write_w83627_reg(0x8, 0xf7, read_w83627_reg(0x8, 0xf7) & 0xef); //clear
status
    write_w83627_reg(0x8, 0x30, read_w83627_reg(0x8, 0x30) | 0x01); //enable
LDN8
    temp = time;
    write_w83627_reg(0x8, 0xf6, temp); //LDN=8, CRF6, set
watchdog timer time-out value

    outportb(INDEX_PORT, 0xaa); //Exit W83627HF
Configuration
    return 0;
}
int read_w83627_reg(int LDN, int reg)
{
    outportb(INDEX_PORT, 0x07); //LDN register
    delay(1);
    outportb(DATA_PORT, LDN);
    delay(1);
    outportb(INDEX_PORT, reg);
    delay(1);
    return inportb(DATA_PORT);
}

```

```
int write_w83627_reg(int LDN, int reg, int value)
{
    outportb(INDEX_PORT, 0x07); //LDN register
    delay(1);
    outportb(DATA_PORT, LDN);
    delay(1);
    outportb(INDEX_PORT, reg);
    delay(1);
    outportb(DATA_PORT, value);
    return 0;
}
```

Note: The watchdog function is from the WINBODN 83627UHG.. Lanner provides sample codes in the Manual/ Driver CD under the path: LEC-2010 Driver / LEC-2010 Utility/WatchDog

C. Appendix C: DIO

C.1 To use the DIO

For DOS system:

Execute the DIO.EXE file under DOS (DIO.EXE and CWSDPMI.EXE should be placed on same directory).

DIO sample code:

```
#include <stdio.h>
#include <dos.h>

/* This program assume 4 Input and 4 output      */
/* Digital Input=GP24,25,26,27==> mapping to OUT0~3 */
/* Digital Output=GP60,61,62,63 ==> mapping to IN0~3 */

#define SUPERIO_INDEX 0x2e
#define SUPERIO_DATA 0x2f
#define BANK_REG 0x07

#define GPIO0 0x01
#define GPIO1 0x02
#define GPIO2 0x04
#define GPIO3 0x08
#define GPIO4 0x10
#define GPIO5 0x20
#define GPIO6 0x40
#define GPIO7 0x80

int print_help(char *argv[])
{
    printf("using: %s [i/o] [value]\n", argv[0]);
    printf("Note:all data in hexadecimal format\n");
    printf("eg: %s i ==>read Digital Input pin(3 2 1 0)\n");
    printf("    %s o 8 ==>write 1000 to Output pin(3 2 1 0)\n");
    printf("    %s o 0 ==>write 0000 to Output pin(3 2 1 0)\n");
    printf("    %s o f ==>write 1111 to Output pin(3 2 1 0)\n");
    printf("Program terminated !!!\n");
    exit(1);
}

void enter_sio_config()
{
    outportb(SUPERIO_INDEX, 0x87);
    delay(1); //delay some time
    outportb(SUPERIO_INDEX, 0x87);
}

void exit_sio_config()
{
    outportb(SUPERIO_INDEX, 0xaa);
}

unsigned char read_sio_reg(unsigned char bank_no, unsigned char reg_no)
{
    unsigned char reg_data;
```

```

enter_sio_config();
outportb(SUPERIO_INDEX, BANK_REG);
delay(1);
outportb(SUPERIO_DATA, bank_no);
delay(1);
outportb(SUPERIO_INDEX, reg_no);
delay(1);
reg_data=inportb(SUPERIO_DATA);
exit_sio_config();
return reg_data;
}

void write_sio_reg(unsigned char bank_no, unsigned char reg_no, unsigned char
write_data)
{
enter_sio_config();
outportb(SUPERIO_INDEX, BANK_REG);
delay(1);
outportb(SUPERIO_DATA, bank_no);
delay(1);
outportb(SUPERIO_INDEX, reg_no);
delay(1);
outportb(SUPERIO_DATA, write_data);
exit_sio_config();
}

unsigned char Get_DIO_Input_value()
{
unsigned char temp1;
temp1 = (read_sio_reg(0x08,0xE5) & 0x0F);
return temp1;
}
void Set_DIO_Output_value(unsigned char temp1)
{
write_sio_reg(0x09,0xE5, (read_sio_reg(0x09,0xE5) & 0x0F) | temp1);
}
void Init_GPIO(void) {
write_sio_reg(0x09,0x30,0x02); //;enable GPIO2
function
write_sio_reg(0x08,0x30,0x04); //;enable GPIO6
function
write_sio_reg(0x09,0xE4,(read_sio_reg(0x09,0xE4) &
~(GPIO4+GPIO5+GPIO6+GPIO7))); //;set GPIO24,25,26,27=output
write_sio_reg(0x08,0xE4,(read_sio_reg(0x08,0xE4) |
(GPIO0+GPIO1+GPIO2+GPIO3))); //;set GPIO60,61,62,63=input
}

main(int argc, char *argv[])
{
int io_mode; //0: read 1:write
char *ptr;
unsigned char tmp;
unsigned char Input_value, Output_value;

printf("=====\n");
printf(" Digital IO test program for LEB-2010I Ver: 1.0\n" );
printf("=====\n");
Init_GPIO();
if ((argc<2)|| (argc>4))
{
print_help(argv); //;The parameter over or not enough

```

```

}
if((*argv[1]=='i')|(*argv[1]=='I')) {
    io_mode=0;                                     ///<0 for read
} else {
    if((*argv[1]=='o')|(*argv[1]=='O')) {
        io_mode=1;                                 ///<1 for write
        // try to get the value which want to be write
        ptr=argv[2];
        tmp=*ptr;
        switch (tmp)
        {
            case '0':
                Output_value = 0;
                break;
            case '1':
                Output_value = 1;
                break;
            case '2':
                Output_value = 2;
                break;
            case '3':
                Output_value = 3;
                break;
            case '4':
                Output_value = 4;
                break;
            case '5':
                Output_value = 5;
                break;
            case '6':
                Output_value = 6;
                break;
            case '7':
                Output_value = 7;
                break;
            case '8':
                Output_value = 8;
                break;
            case '9':
                Output_value = 9;
                break;
            case 'a':
            case 'A':
                Output_value = 10;
                break;
            case 'b':
            case 'B':
                Output_value = 11;
                break;
            case 'c':
            case 'C':
                Output_value = 12;
                break;
            case 'd':
            case 'D':
                Output_value = 13;
                break;
            case 'e':
            case 'E':
                Output_value = 14;
                break;
            case 'f':
            case 'F':

```

```
        Output_value = 15;
        break;
    default:
        print_help(argv);
    }
}
else {
    print_help(argv);
}
}

if(io_mode==0) {
    Input_value = Get_DIO_Input_value();
    printf(" The Input pin of Digital IO = 0x%x\n", Input_value);
} else {
    Set_DIO_Output_value(Output_value <<4); // use bit3~0 map to GPO24~27
    printf(" write done...\n");
}
}
```

Note: The DIO function is from the WINBODN 83627UHG. Lanner provides sample codes in the Manual/Driver CD under the path: LEC-2010 Driver / LEC-2010 Utility/4bit-DIO

Terms and Conditions

Date: 2007.03.19

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
 - Improper or inadequate maintenance by the customer
 - Unauthorized modification, misuse, or reversed engineering of the product
 - Operation outside of the environmental specifications for the product.

RMA Service :

Requesting a RMA#

1. To obtain a RMA number, log on to the leRMA web interface at <http://erma.lannerinc.com> . Use you user name and password as supplied to you from your Lanner account manager.
2. Once you have logged on, follow the onscreen instructions to complete the RMA process.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.

Note: If you have any issues with the eRMA system, email support@lannerinc.com for assistance.